THE IRON TRADE REVIEW

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INCREASED STRENGTH

IN ALL LINES IN ALL CENTERS.

Duty of 15 Cents on Iron Ore—Basic Advances in the East—Large Tonnage of Structural Steel Placed—Railroad Buying.

In all centers, the iron and steel market shows increased strength. So far, the midsummer dullness has not developed, and instead, new tonnage and specifications grow in volume from week to week. The advance of $2 a ton on wire products is the forerunner of higher prices on plates, shapes and steel bars, on which the leading interest has been trailing the independents, while the increase of $2 a ton on wire rods indicates a growing scarcity of semi-finished steel. The quarterly report of the United States Steel Corporation reflects the general improvement in iron and steel trade conditions. Unfilled orders on June 30 reached the enormous total of 4,057,939 tons, as compared with 3,542,595 tons on March 31, and the earnings amounted to $29,340,491 against $22,921,268 the first quarter. A striking feature of the statement of earnings from month to month is the steady increase, which was accelerated as the summer approached.

Iron Ore Situation

As a result of a protest against free ore, made this week by independent producers, it is probable that the conference report will carry a duty of 15 cents a ton. No reduction from the rate fixed by the senate bill was urged, but a compromise, reducing the duty 10 cents a ton, will undoubtedly be agreed upon. A cloudburst on the Mesabi range which temporarily put the mines out of commission has seriously deranged the ore trade. Vessels have been waiting for days to complete their cargoes at upper lake ports, and shipments for July, it is expected, will fall below six million tons.

Pig Iron

Although buying of pig iron in large lots to cover future requirements has almost entirely subsided, nevertheless, there is an active demand for small tonnages from the gray iron and malleable foundries. Producers are not inclined to book heavily into the first half of next year, and have advanced prices for this delivery. In the south, several furnaces have withdrawn quotations and others are quoting from $13 to $13.50, although it is reported that orders can still be placed in Chicago on the basis of $12.50 to $12.75, Birmingham. The recent heavy buying of basic in the east has resulted in an advance of $1 a ton. The report that the Steel Corporation is in the market for a large tonnage of basic for one of its eastern plants has been denied. The rate at which the Corporation furnaces are now operating leaves little doubt but that the month will set a new production record. The pig iron producing capacity is being rapidly increased by the blowing in of idle stacks in all sections of the country, and the Carnegie Steel Co. is now operating 51 of its 59 furnaces.

Railroad Buying

While no large individual orders for cars are being placed by the railroads, nevertheless buying is general and orders numerous. The Pennsylvania railroad has specifications out for 3,000 cars, of which 2,000 will be of all steel construction. Other orders placed include the Buffalo & Rochester & Pittsburg, 500 cars; Chesapeake & Ohio, 500 hopper cars; Denver & Rio Grande, 4,050, and the Chicago & Northwestern, 1,500 cars. Inquiries for cars have been received from the following

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FOREIGN IRON ORE

SHIPMENTS TO EASTERN FURNACES.

Growing Disposition to Curtail Consumption of Lake Ores—Extensions to Eastern Ore Mining Operations.

A careful inquiry into the iron ore conditions of eastern furnaces discloses the fact that, with the exception of limited tonnages sold by three lake producers, there has been no activity and there is now extremely little interest in the western product. The rate of operations in the Lehigh and Schuylkill valleys has been restricted merely to meeting the current demand without the accumulation of pig iron stocks, hence ore supplies have been conserved to such an extent that for the most part furnaces are in fairly comfortable shape for the remainder of the year. For later delivery, no selling efforts are being made except by Sota & Aznar (Spanish), which disposed of a round tonnage to plants east of the mountains late in 1908 and are now offering their American allotment for 1910.

Growing Consumption of Foreign Ore.

For some time there seemingly has been an increasing disposition on the part of eastern furnaces to operate, so far as possible, independent of the lake source of ore supply. In rush times, and even in periods of moderate activity, this is not entirely possible, but with conditions as they have been for the past 18 months the local supply, coupled with the important movement of foreign ore, has been sufficient practically to eliminate purchases from the Superior district. Both foreign ore and that mined in the Adirondacks, lower New York and in the New Jersey-Pennsylvania region have been secured, delivered at eastern plants, at a unit cost considerably lower than the cheapest lake ores, a fact which has given local miners a good volume of business throughout the depression and is now causing them to operate at maximum capacity.

There is good reason to believe that

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THE WEEK IN IRON CENTERS

PITTSBURG.

Shortage of Semi-Finished Steel More Pronounced—Pig Iron Firm.

Office of THE IRON TRADE REVIEW, 510 Park Building, July 27.

Favorable indications of the comfortable position of iron and steel makers with respect to active tonnage on mill books and as to current new orders, are manifested by the developments of the market. Price changes of the week have included a general addition of $2 a ton to the quotations on wire products, making a total advance of $4 a ton since the sharp reduction of $7 to $10 a ton, effective May 1. An advance in steel pipe is also believed to be close at hand.

A factor of importance and one significant of the strength of the situation is found in the increasing shortage in semi-finished steel. A number of the principal makers are apparently disposed to either reserve their marketable surplus for future requirements or are actually devoting their free supply to their own finishing needs which are very heavy. Steel-making capacities generally are running full. An important interest in the past 10 days has declined to quote on offerings of forging billets amounting to about 25,000 tons. As a consequence of the restricted market, buyers of billets, slabs, sheet and tin bars are encountering some difficulty in meeting their wants.

The restlessness of labor which is expressing itself in the numerous controversies and strikes in the several branches of the iron and steel industry is the only disturbing element of the situation. Conditions among the struck plants of the American Sheet & Tin Plate Co., the Youngstown Sheet & Tube Co., and other interests have not been greatly altered, although non-union organizations are being assembled and operations are gradually increasing. The men are devoting their energies towards unionizing some of the operating mills.

The favorable report of the United States Steel Corporation for the quarter ending July 1, showing net earnings of approximately $29,300,000, an increase of more than $6,000,000 over the preceding quarter, and unfilled tonnage of slightly more than 4,000,000, or a gain of 500,000, has been well received as tangibly reflecting the improvement in the industry during the past three months. It is pointed out, however, that the situation at present, as to unfilled tonnage, is still more encouraging since the heaviest orders for steel material of any month since the revival of trade have been entered during July, or following the period covered by the report.

Pig Iron.—A quiet week has ruled in pig iron as there have been few inquiries before sellers demanding immediate attention. Consumers are well covered against pressing needs and are taking iron on contract quite well, although there have been some requests for deferred shipments from gray iron foundries. The Bessemer market has been given a strong tone by the large sales which have been made during the past month and which are estimated at 80,000 tons, divided wholly among three important steel companies. A number of makers are holding for $16 furnace and a small sale is reported this week at this figure as well as several transactions for forward shipment at $15.75, valley, which appears to be the present market level. Bessemer is advancing as sales were made one week ago at $15.50 valley furnace, principally for prompt metal. Additional heavy purchases are expected to be made by large interests in the near future but nothing has developed from the reported intention of the United States Steel Corporation in this direction. A local steel company bought 1,500 tons of steel-making iron, 500 tons of Bessemer and 1,000 tons of basic for third quarter shipment. Basic is quoted at from $15 to $15.25, valley. A southern Ohio steel maker also took several thousand tons from an Ohio producer at about $15.50 furnace. In foundry, the price range is from $15.25 to $15.50, valley, for No. 2. Small sales were made this week at $15.25 and $15.40, valley. The inquiry is only fair. An inquiry for 1,000 tons of forge has been made by a local mill. One southern interest has advanced its price to $13, Birmingham, for No. 2. Another has raised its asking quotation to $13.50, Birmingham, but no sales have been made at this level. On northern iron for prompt and third quarter shipment, we quote as follows:

Bessemer, valley	$15.75 to 16.00
Bessemer, Pittsburg	16.65 to 16.90
No. 2 foundry, Pittsburg	16.00 to 16.40
Gray forge, Pittsburg	14.90 to 15.15
Basic, valley	15.00 to 15.25
Basic, Pittsburg	15.90 to 16.15

Muck Bar.—A sale of 1,000 tons of all-pig muck bar at $28, delivered Pittsburg, is noted.

Iron Skelp.—Several hundred tons of grooved iron skelp were sold this week at 1.65c Pittsburg. We quote the market at this price and sheared iron skelp at from 1.70c to 1.75c Pittsburg.

Ferro-Alloys.—As the duty on ferro-silicon in the new tariff bill has become more generally understood, consumers of both the lower grades and 50 per cent material, have been showing considerable interest in the market. A number of sales of 50 per cent ferro-silicon have been made here at about $62.50 delivered subject to present duty, and there has also been selling of the lower grades at about the quoted prices. Ferro-manganese is quiet. We quote ferro-manganese at from $41.50 to $42 Baltimore, present duty, prompt shipment, or for delivery this year and the first half of 1910, $42.50 to $43.50, Baltimore. The freight from Baltimore to Pittsburg is $1.95.

Fifty per cent ferro-silicon is quoted at $61.50 to $62.50 Pittsburg on forward deliveries, at present duty; domestic, 12 per cent, $25; 11 per cent, $24; 10 per cent, $23 Pittsburg.

Plates.—In addition to orders recently announced, the Chesapeake & Ohio railroad has placed a second lot of 500 hopper cars with the Pressed Steel Car Co., and the steel material, about 7,000 to 8,000 tons, will be furnished by the Carnegie Steel Co. The Chesapeake & Ohio's total purchases of steel cars have been 4,000, of which 2,000 went to the Standard Steel Car Co., 1,000 to the American Car & Foundry Co. and 1,000 to the Pressed Steel Car Co. The latest purchase completes the road's car buying program for this season. In addition to the 1,000 steel cars recently placed with the Cambria Steel Co. by the Buffalo, Rochester & Pittsburg railroad, this line has ordered 500 box cars from the American Car & Foundry Co. and 500 box cars from the Standard Steel Car Co. The car builders are now preparing bids on a lot of 3,000 freight cars for the Pennsylvania railroad of which about 2,000 will be of all-steel construction. The strike troubles of the Pressed Steel Car Co. and Standard Steel Car Co. have greatly diminished specifications for plates and shapes because of curtailed operations. Miscellaneous plate consumers however, are ordering very freely. The plate market is strong at the 1.35c minimum and some independents are asking as high as 1.45c mill. We quote the market on plates as follows:

Tank plates, ¼-inch thick, 6¼ to

100 inches, 1.35c to 1.45c mill. Extras are as follows per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edges, 0.10c; under 3/16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—Conditions in sheets are maintaining a steady improvement, as current new business and specifications are heavy and prices are firmer than they have been for months. There is a good demand for roofing material and orders involving between 2,500 and 3,000 tons of corrugated sheets are now pending for large mill construction work in this district. The labor situation is causing less interruption of manufacturing. This week the American Sheet & Tin Plate Co. has running in full its Vandergrift unit composed of 58 mills and including the Vandergrift, Leechburg, Hyde Park and Saltsburg plants. The Saltsburg plant was put on in full this week. The company is now operating 134 sheet mills out of a total of 186 mills or 72 per cent of capacity, which was about the activity of the company when the strike of the Amalgamated association was declared. The Youngstown Sheet & Tube Co. which is also facing a strike in its sheet department, is getting its mills under way with non-union men. We quote present sheet prices as follows:

Blue annealed sheets, Nos. 10 and heavier, 1.60c; Nos. 11 and 12, 1.65c; Nos. 13 and 14, 1.70c; Nos. 15 and 16, 1.80c; box annealed sheets, Nos. 10 to 12, 1.85c; Nos. 13 and 14, 1.90c; Nos. 15 and 16, 1.95c; Nos. 17 to 21, 2c; Nos. 22 to 24, 2.05c; Nos. 25 and 26, 2.10c; No. 27, 2.15c; No. 28, 2.20c; No. 29, 2.25c; No. 30, 2.35c; galvanized sheets, Nos. 13 and 14, 2.25c; Nos. 15 and 16, 2.40c; Nos. 17 to 21, 2.50c; Nos. 22 to 24, 2.65c; Nos. 25 and 26, 2.85c; No. 27, 3.05c; No. 28, 3.25c; No. 29, 3.40c; No. 30, 3.65c; painted roofing sheets, $1.55 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $2.80 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—The American Sheet & Tin Plate Co. is now running at part capacity with non-union men, four of its largest plants which had been unionized and were struck by the Amalgamated association July 1. These works are the American at Elwood, Ind., Greer and Shenango at New Castle, Pa., and Sharon at Sharon, Pa., having a total equipment of 98 hot mills of which 24 are now operating. It is expected that the company will gradually increase its operations at these plants as market conditions require. The Pittsburg plant at New Kensington, Pa., which has been non-union, but had been induced by the union leaders to join their cause is again operating in full this week. Strong efforts are being made by the union to organize the Sabraton works at Morgantown, W. Va. The total operations of the company this week are 113 hot mills or 47 per cent of total capacity, which is equivalent to 54 per cent of serviceable capacity. Tin house operations are being increased without much difficulty and in some plants the active finishing capacity exceeds that of the rolling mills. Prospects for the fruit and vegetable crop are indicating a larger yield than first anticipated and it is likely that the season's pack will require additional tin plate material over that already ordered. The independent tin plate companies are running practically full. The McKeesport Tin Plate Co. this week placed contracts for 10 additional mills which will increase its total capacity to 20 mills. Tin plate prices are regular and we quote the present market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.45 f. o. b. mill Pittsburg district and $3.40 in large lots. Terms 30 days less 2 per cent for cash in 10 days.

Rails and Track Material.—The Illinois Steel Co. and Colorado Fuel & Iron Co. are filled up on Bessemer rail tonnage for practically the balance of the year, and as a result some of the western roads which regularly buy from these companies are placing their business with the Carnegie Steel Co. An instance of this was the award of 3,000 tons of standards to the Carnegie company this week by the Denver & Rio Grande railroad. Specifications for 2,200 tons from a western road and 2,000 tons from an Ohio line, to apply against contracts, were also received. Several good-sized inquiries for rails are now pending. Light rails are advancing in price and bookings are good, those of the Carnegie company this week being 2,000 tons. There is a very heavy demand for track fastenings and the splice bar department at the Duquesne works is rushed with orders. Spikes are showing more firmness and business is being taken at 1.65c Pittsburg. We quote the market on Bessemer rails as follows, the price on open-hearth rails being $30 mill.

Fifty-pound and heavier, 500-ton and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 8-pound, $30; 12-pound, $29; 16 to 25-pound, $28; 30 to 35-pound, $27.75; 40 to 45-pound, $27; angle splice bars for standard sections, 1.50c Pittsburg; standard spikes, 1.65c to 1.70c Pittsburg; hand spikes, 1.65c to 1.75c Pittsburg.

Steel.—A considerable scarcity of material and an insistent demand by consumers for all grades of semi-finished steel, have placed the market in a strong position. Many makers are not disposed to take on additional tonnage and are turning down inquiries without quoting. One important interest has declined to consider offers of about 25,000 tons of forging billets during the past several weeks. A sale of 3,000 tons of forging billets was made this week at about $27.50 Pittsburg. It is freely predicted that a great shortage of steel will be encountered when business reaches a normal stage in all branches. Prices are very strong.

Bessemer 4 x 4 billets with 0.25 carbon and less are regularly quoted at $24 to $25 Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets from $24 to $25 Pittsburg. Forging billets are held at $27 to $28 Pittsburg. Sheet and tin bars are quoted at from $25 to $26 Pittsburg.

Hoops and Bands.—Contracting in hoops for any extended shipment shows the market firmly established at 1.50c, Pittsburg, base. On preferred and immediate specifications however, price concessions have been made. The principal consumers are not buying at this time but the miscellaneous trade is ordering well. We quote the present market as follows:

Hoops in carload lots, 1.40c to 1.50c; in less than carload lots, 1.60c; bands, 1.25c, base half extras as per standard steel.

Merchant Bars.—The bar iron market which has recently undergone several successive price advances, is showing considerable more activity. The railroads are buying more freely for car repairs and consumers

have been manifesting a desire to contract for extended deliveries, to which the mills are not agreeable. Some sales in advance of the quoted market are reported. The heavy movement in steel bars shows no signs of diminution and in fact, continues to expand. More business is being taken at the 1.30c level, which is the price of the large independents, but the 1.25c quotation is still being made by the principal interest. Present prices are being accepted only for specifications within 90 days. Deliveries are falling behind, and with some companies run from six to eight weeks. The shafting market is enjoying great activity and some plants are operating double turn for the first time in history. Prices are unusually firm for this product. Jobber's stocks of shafting have run quite low. We quote the present market as follows:

Common iron bars, 1.45c to 1.50c, Pittsburg; Bessemer and open-hearth steel bars, 1.25c to 1.30c; plow and cultivator, 1.25c to 1.30c; channels, angles, zees, tees, under 3-inch, 1.35c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0,10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 60 per cent in carloads, and 55 per cent in less than carloads, delivered in base territory. Planished and machine straightened tire is 1.45c base; iron finished tire under 1½ by 1½ inches, 1.40c, both plus ½ extra on tire card; iron finished tire, 1½ x ½ and over, 1.25c, plus ½ extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100 inch and thicker, we quote base prices for 100 pounds, $3.05 on hard, and $3.30 on soft.

Structural Material.—A fair amount of new inquiry is appearing in structural lines, largely for new plant and commercial enterprises. Prices of fabricated and erected material continue low, although some companies that have entered considerable of this business are less disposed to be aggressive in bidding. The structural mills are receiving a very liberal assortment of tonnage. Prices on shapes range from 1.35c to 1.45c mill. The steel for the new Sewickley bridge, about 5,500 tons, which will be fabricated and erected by the Fort Pitt Bridge Works has not been formally awarded, but it is expected that it will go to the Jones & Laughlin Steel Co. A new 11-story office building to be erected by the Standard Oil Co. in this city will require about 1,000 tons, the letting of which will be done in New York. Additions to the plant of B. F. Avery & Sons, Louisville, Ky., will take 500 tons. Several large projects are pending in this district. A new plant to be erected by the General Chemical Co. will require a large tonnage. We quote the market on structural shapes as follows:

Beams and channels, 15-inch and under, 1.35c to 1.45c; over 15 inches, 1.45c to 1.55c; zees, 1.35c to 1.45c; tees, 1.35c to 1.45c; angles, from 3 to 6 inches, 1.35c to 1.45c; over 6 inches, 1.45c to 1.55c; universal and sheared plates, 6¼ inches wide and wider, 1.35c to 1.45c.

Merchant Pipe.—There is a general expectation of an advance in steel pipe, but no official announcement has yet been made. The trade has been circularized for August specifications and this is construed as a forerunner of an advance. The books of makers are well filled with tonnage and a very conservative attitude as to accepting much business at today's prices is displayed. A local gas company is figuring on 10 miles of 16-inch pipe and a Buffalo interest is about to place an order for 60 miles of 3 and 10-inch pipe. Although prices of iron pipe were recently advanced $2 to $4 a ton, manufacturers of this product are still reluctant to enter much additional business. We quote the following official discounts on merchant pipe subect to an additional one point and five off to obbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	72	56	67	..
⅜ inch	73	59	68	54
½ inch	76	64	71	59
¾ to 6 inch	80	70	75	65
7 to 12 inch	75	60	70	53
PLUGGED AND REAMED.				
1 to 4 inch	78	68	73	63
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch.....	65	53	60	48
½ to 4 inch.....	72	60	57	55
4½ to 8 inch.....	68	56	63	51
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch.....	61	50	56	45

Boiler Tubes.—Some of the railroads have been more liberal with their purchases and a number of the boiler tube makers have considerable tonnage on their books from this source. The merchant tube trade has also shown more activity but some of the important makers are still in need of orders. Prices are not especially firm. We quote the following official discounts on lap-welded steel boiler tubes to jobbers in carloads:

1 to 1½ inch.....	50
1¾ to 2¼ inch.....	62
2½ inch	64
2¾ to 5 inch.....	70
6 to 13 inch	62

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lenghts, f. o. b. Pittsburg.

We quote the following official discounts on charcoal iron tubes to jobbers:

1 to 1½ inch.....	45
1¾ to 2¼ inch.....	45
2½ inch	50
2¾ to 5 inch	57
6 to 13 inch.....	45

Wire Products.—Effective Monday, July 26, the American Steel & Wire Co. announced an advance of $2 a ton on wire products. These quotations are to apply only to actual specifications within 60 days from time of ordering, and beyond that period an additional advance of $2 a ton is asked. This latter provision especially applies to the contracts for extended shipment for plain wire by the manufacturing trade. The $2 advance just posted is the second made since the sharp reduction of $7 to $10 a ton was put into effect May 1. Since that date, the total advance has been $4 a ton. A corresponding increase has also just been announced in the price of fencing. The independent wire companies have followed the leading interest and have raised their quotations accordingly. Specifications and new business in the wire market at present are coming largely from the manufacturing trade. We have revised our prices and quote the market as follows:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, with 30c for galvanizing; plain wire to jobbers in carloads, $1.60, and to retailers in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.10.

Wire Rods.—Athough an official announcement has not yet been made, an advance of $2 a ton on wire rods is expected, which will place the market at $31, Pittsburg, on Bessemer, and $32, Pittsburg, on open-hearth rods.

Coke.—Interest among coke operators has been centered on the modified proposition of payment submitted to the plant owners by the promoters of the proposed merger of independent, Connellsville properties, as previously announced. Some of the operators are freely expressing their dissatisfaction with the plan and declare their unwillingness to dispose of their plants on this basis. In the supplement to the optional agreement which expires Oct. 1, the promoters stipulate that title will pass after Dec. 1, and an organization will then be effected. Improvement in the coke market continues to be held in check by the low priced prompt material that is being offered particularly in furnace coke, in which $1.50 ovens is being done. This condition is keeping some consumers from contracting for extended

periods at advanced prices. Some companies are shipping large tonnages on contracts and are much stronger in their views of prices. One large interest this week refused to quote at less than about $2.25 ovens on furnace coke for first half. There is also a more optimistic spirit in other quarters. Foundry coke is moving well on contract, but new business is not heavy. We quote spot furnace coke at from $1.50 to $1.60, ovens and on contract from $1.65 to $1.75 ovens according to grade. On first class Connellsville foundry coke, the range is from $1.80 to $2, ovens, for prompt shipment and on contract from $2 to $2.25, ovens. The *Courier's* figures for the week ending July 17 show 30,129 ovens active with an output of 384,425 tons, compared with 29,683 active ovens and a production of 290,467 tons the previous week.

Old Material.—A waiting situation prevails in old material as the mills are not manifesting any pressing needs of tonnage while the dealers are inclined to be bullish and to hold their accumulations for higher prices. The mills are evidently well covered, but the holders likewise appear content to take their chances with what they believe is a rising market. Little tonnage is being forced for sale and the monthly lists of the railroads are the main source of supply. Prices are practically unchanged. We quote gross tons delivered in the Pittsburg district as follows:

Heavy melting scrap, $15.50 to $16; rerolling rails, $16 to $16.50; bundled sheet scrap, $13.75 to $14.25; iron axles, $23 to $24; old iron rails, $18.50 to $19; No. 1 wrought scrap, $15.75 to $16.25; old car wheels, $15.50 to $16; low phosphorus, $19 to $20; machine shop turnings, $11.25 to $11.75; cast borings, $9.25 to $9.75; No. 1 cast scrap, $15 to $15.50; malleable, $15 to $15.50; stove plate, $11.50 to $12.

CHICAGO.

Orders for Cars More Numerous—Wire Rods Advanced.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, July 27.

An advance of $2 a ton in wire products and a corresponding advance in wire rods are the main developments of the week's activities. Rods are now quoted at $31, Pittsburg, and the new wire schedule is based on $1.98, Chicago, for nails. The market is very strong in all departments and advances in other materials are reported imminent. Specifications for plates, structurals, bars and sheets are exceedingly heavy, and in some products deliveries are as remote as 10 weeks. Lettings last week for fabricated steel totaled 6,000 tons, and of heavy rails the new contracts amounted to 11,000 tons. There was also about 5,000 tons of cast iron pipe awarded. Pig iron continues active and offerings of Ohio irons are being made for 1910 delivery on the basis of $17.20 Chicago. The shortage in billets remains very acute, and until the Gary mill is started it will be difficult to place new tonnage here. Inquiries for new cars are growing in number, and specifications for material for this construction are very heavy. One last week was for 7,000 tons. The Denver & Rio Grande has ordered 4,050 cars, and the B. & O. is asking prices on 5,050 and the C. & N. W. on 1,500 steel underframe gondolas.

Pig Iron.—In a quiet way, foundries are covering for their requirements over the balance of the year. Purchases for the most part are from northern furnaces and these have taken a round tonnage in the past week, ranging downwards from 2,000 tons. Several orders were of 1,000 tons each. Some malleable foundries in this territory have placed orders with a western Ohio furnace for the first quarter of 1910 on the basis of $15.50, furnace, which is equivalent to $17.20 Chicago. That this is a good price goes without saying in view of conditions, present and prospective. One order for this delivery was for 1,000 tons. The local furnaces are not anxious for 1910 tonnage and decline to bid except where pressed. There is no change in quotations for this year's delivery, and local irons continue to be offered at $16.50, furnaces. Southern Ohio irons are offered at $16.90 delivered Chicago. The Alabama product can still be had at $12.50 Birmingham, but there is not a great amount available at this figure. All the leading southern interests have withdrawn from the market, leaving only a few scattering furnaces willing to take on more tonnage at this figure. We quote for Chicago delivery, as follows:

Lake Superior charcoal	$19.50 to 20.00
Northern foundry No. 1	17.50
Northern foundry No. 2	17.00
Northern foundry No. 3	16.50
Southern foundry No. 1	17.35 to 17.85
Southern foundry No. 2	16.85 to 17.35
Southern foundry No. 3	16.35 to 16.60
Southern foundry No. 4	15.85 to 16.10
Southern No. 1 soft	17.35 to 17.85
Southern No. 2 soft	16.85 to 17.35
Southern gray forge	15.60 to 15.85
Southern mottled	15.25 to 15.60
Southern silveries, 4 per cent silicon	17.85 to 17.85
Southern silveries, 5 per cent silicon	17.85 to 18.35
Southern silveries, 6 per cent silicon	18.85 to 19.35
Jackson Co. silveries, 6 per cent.	19.90
Jackson Co. silveries, 8 per cent.	20.90
Jackson Co. silveries, 10 per cent	21.90
Malleable Bessemer	17.00
Standard Bessemer	17.65 to 17.90
Alabama basic	16.85 to 17.35

Billets.—The American Steel & Wire Co. announced a further advance in wire rods, effective July 26, increasing the price to $31, Pittsburg, for both Bessemer and basic. Forging billets are still held at $28 base, Chicago, and are very firm and hard to obtain at that price. Rolling billets range from $26 to $27, varying according to the conditions surrounding each purchase. Intermediate steel is very scarce in this market, and until the Gary mill is in operation little relief is promised.

Merchant Bars.—The western merchant mills are crowded with specifications. Additional contracts have been placed within the week, but this tonnage is light compared with that for which prompt shipment is demanded. The specifications daily exceed mill output, and deliveries are falling further behind. It is a little better on iron bars than steel, but with the large and steady inquiry for car material now coming in it can be only a matter of a few weeks before the former will also be facing an acute delivery problem. The Denver & Rio Grande ordered 4,000 cars last week, and the C. & N. W. is in the market for 1,500 steel underframe gondolas. In addition to these, there is a large number of miscellaneous cars being figured on for various roads. We quote for Chicago delivery, as follows:

Bar iron, 1.35 to 1.40c; hard steel bars, 1.30c to 1.35c; soft steel bars and bands, 1.43c to 1.48c, half extras; soft steel angles, less than 3 x 3, 1.58c, half extras; hoops, 1.63c to 1.68c base, full extras; planished or smooth finished tire steel, 1.63c to 1.68c; iron finish, up to 1½ x ½ inch, 1.63c base, tire card; iron finish, 1½ x ½ inch and larger, 1.43c to 1.48c base, steel card; channel for solid rubber tires, ¾ to 1 inch, 1.93c to 1.98c; and 1⅛ inch and larger, 1.83c to 1.88c; smooth finished machinery steel, 1.73c; flat sleigh shoe, 1.53c; toe calk steel, 2.03c; spring steel, 2.08c; crucible spring steel, 2.58c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 60 per cent off the list for carload lots, and 55 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.70c to 1.80c, base, full extras; soft steel bars, 1.50c per 100 pounds base, plus half extras. soft steel hoops, 2.20c, full extras.

Plates.—There is an ever-widening demand for plates. Both the universal and sheared plate mills at South Chicago are operating at capacity and are from seven to nine weeks behind their

orders. Car specifications are very heavy, one as high as 7,000 tons being received last week. Since the first of July, the specifications have been heavier than for the corresponding periods in the months of May and June. No summer dullness has been noticed so far, except for a slight decrease in new tonnage. Prices are very firm, and we quote for Chicago delivery, as follows:

Tank plates, ¼-inch thick, 6½ to 100 inches, 1.58c. For extras see Pittsburg report. Store quotations are without change, as follows:

Tank steel, ¼-inch and heavier, up to 72 inches wide, 1.70c; from 72 inches wide to 96 inches wide, 1.80c; 3/16-inch up to and including 60 inches wide, 1.80c to 1.85c; 72 inches wide, 2.05c to 2.10c; No. 8 up to 60 inches wide, 1.80c to 1.85c. Flange and head quality, 25c extra.

Sheets.—Mills report a good run of specifications for black, galvanized and roofing sheets. The local manufacturer is not actively seeking new tonnage, having specifications in hand for eight to ten weeks' output. Jobbers' stocks are very low, and appeals for immediate shipment are frequent and insistent.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents. We quote store prices at Chicago as follows:

No. 10, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; Nos. 18-20, 2.50c to 2.55c; Nos. 22-44, 2.55c to 2.60c; No. 26, 2.60c to 2.65c; No. 27, 2.65c to 2.70c; No. 28, 2.75c to 2.80c; No. 30, 3.05c; galvanized sheets, Nos. 10 to 16, 3c to 3.10c; Nos. 18 and 20, 3.05c to 3.15c; Nos. 22 to 24, 3.20c to 3.25c; No. 26, 3.40c to 3.45c; No. 27, 3.60c to 3.65c; No. 28, 3.80c to 3.90c; No. 30, 4.20c to 4.50c.

Structural Steel.—The consumption of shapes shows no signs of diminishing. Each week sees an increase in the total amount of specifications, and each week sees the mills a little further behind in deliveries. Car shops, bridge works, railroad equipment shops and general fabricators are negotiating for further tonnages and specifying to the limit on existing contracts. Some mills are declining business because they are unable to make the deliveries required, and this is true also of several fabricators. The highway bridge to be erected at Portland, Ore., which has been under negotiation for some time, has been let to the Pennsylvania Steel Co. There were 2,300 tons in the steel contract. The general contractors for the Citizens Bank, Omaha, the James Black Masonry & Construction Co., St. Louis, have let the contract for the steel work, of which there is 1,680 tons, to the Brown Ketcham Iron Works, Indianapolis. The Morava Construction Co., Chicago, secured the contract for the new sheet mill of the Inland Steel Co., 800 tons. Other contracts include a 177-foot span bridge for the Illinois Central, 250 tons, awarded to the American Bridge Co.; machine shop building, Purdue University, 210 tons, let to the Lafayette Engineering Co., Lafayette, Ind.; St. Theresa Academy, Kansas City, Mo., 270 tons (administration and fine arts building), let to the Kansas City Structural Steel Co.; Sixteenth street viaduct, Denver, 300 tons, American Bridge Co.

We quote mill prices for structural shapes, Chicago delivery, as follows:

Beams and channels, 15-inch and under, 1.58c. For extras, see Pittsburg report. Local store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $1.70 per 100 pounds; angles over 6 inches, $1.80 per 100 pounds base; beams, 3 to 15 inches, inclusive, $1.70 per 100 pounds base; channels, 3 inches and larger, $1.70 per 100 pounds base.

Rails and Track Supplies.—Additional tonnage for standard rails received by the local mill last week aggregated 11,200 tons, divided as follows: One thousand tons, Guggenheim interests; 1,000 tons, Stanley, Merrill, Phillips Lumber Co.; 7,800 tons, Santa Fe; 650 tons, United Railways Co., St. Louis; 500 tons, Springfield Inter-Traction Co.; 250 tons, Chicago & Oak Park Elevated R. R. Light rails are not in heavy demand, but prices remain firm. Specifications and new contracts for track supplies are heavy, the entire output of western mills going into immediate consumption.

See Pittsburg report for prices on standard sections. On light rails, Chicago delivery, we quote as follows:

Light rails, 40 and 45-pound, $26; 30 and 35-pound, $26.75; 16, 20 and 25-pound, $27; 12-pound, $28. In lots of 250 to 500 tons a reduction of 60 cents a ton from these prices is made; lots of 500 tons and up carry a reduction of $1 a ton. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.75c to 1.85c; smaller size spikes, 1.85c to 1.95c base; track bolts, with square nuts, 2.15c to 2.20c; with hexagon nuts, 2.30c to 2.40c.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. reports contracts secured last week, as follows: Milwaukee, 2,350 tons; Newport, Ky., 1,100 tons; Delta, O., 350 tons, and Newark, O., 125 tons. Osage, Kan., will award contracts this week for 700 tons. Routine inquiry is reported very good, though mostly for small lots. Prices are without change as follows: Four-inch water pipe, $27.50; 6 to 14 inches, $26.50; larger sizes, $25.50; gas pipe, $1 a ton higher.

Wire Products. — Heavy shipments on all contracts are going forward, but specifications continue in excess of output. One of the most surprising features of the trade is the continued excellent consumption of barb wire, which remains almost as good as in the late spring months. The American Steel & Wire Co. announced an advance of $2 a ton in nails, barb wire, smooth wire and staples, effective July 26. We have revised our prices, and quote Chicago delivery as follows: Wire nails, jobbers' car lots, $1.98; retailers' carload lots, $2.03; retailers, less than carload lots, $2.13; painted barb wire, jobbers' carload lots, $1.98; retailers, carload lots, $2.03; with 30c for galvanizing; plain wire to jobbers, carload lots, $1.78; staples, $1.98; woven wire fence has been advanced proportionately.

Old Material.—The market has recovered somewhat of its lost strength, the firmness of scrap in other centers being largely the cause. Prices are 25 cents a ton higher this week, and indications point to a further advance at an early date. Locally, there is not an active trading element, and it is impossible to get any large tonnage at the quoted minimum prices. This sentiment has served to restrict sales, the larger class of melters not being inclined to pay the maximum prices at present. Malleable foundries have been buying freely of late, but iron and steel mills are practically out of the market. We have revised our prices, and quote gross tons in the first paragraph, as follows:

Old car wheels	15.75 to 16.00
Old iron rails	**17.00 to 17.25**
Rerolling rails (4 ft. and over)	15.25 to 15.75
Old steel rails (2 ft. and under)	15.25 to 15.50
Light section relayers, 45 lbs. and under subject to inspection	**21.00 to 23.00**
Relaying rails, subject to inspection	22.50 to 23.50
Frogs, switches and guards	14.50 to 14.75
Heavy melting steel	14.25 to 14.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.50 to 13.75
No. 2 R. R. wrought	12.50 to 12.75
Arch bars and transoms	16.25 to 16.50
Knucklers, couplers and springs	13.50 to 13.75
Shafting	15.50 to 15.75
Iron car axles	18.25 to 18.50
Steel car axles	17.75 to 18.25
Locomotive tires	15.25 to 15.50
Dealers' forge No. 1	11.00 to 11.25
Pipes and flues	**9.75 to 10.00**
No. 1 cast, 150 lbs. and less	**13.50 to 13.75**
No. 1 busheling	11.00 to 11.25
No. 2 busheling	8.00 to 8.25
No. 1 boiler cut	9.00 to 9.50
Boiler punchings	**13.25 to 13.50**
Cast and mixed borings	6.00 to 6.25
Machine shop turnings	8.25 to 8.50
Railroad malleable	13.25 to 13.50
Agricultural malleable	11.75 to 12.00
Stove plate and light cast scrap	11.75 to 12.00
Angle bars, splices, etc. (iron)	15.75 to 16.00

CLEVELAND.

Protest Against Free Ore—Wire Prices Advanced.

Office of THE IRON TRADE REVIEW,
Browning Building, July 27.

Iron Ore.—At a meeting of representatives of Lake Superior iron ore producers held at the offices of Pickands-Mather & Co., on Saturday, July 24, the proposed removal of the duty on iron ore was discussed at length, and it was decided to file a vigorous protest against this action. Telegrams were sent to both the president and vice president, voicing the sentiments of all of the independent producing mining companies in the Lake Superior ore regions, having a combined annual producing capacity of over 20,000,000 tons. The telegram protested against the admission of ore free of duty, and it further stated that the reduction made in the senate bill is all that the industry can stand, without serious results, and that any further reduction would be disastrous to the shipping and mining interests, involving as well, hundreds of thousands of men employed in this work. The telegrams were signed by Oglebay, Norton & Co., M. A. Hanna & Co., Pickands, Mather & Co., Corrigan, McKinney & Co., the Tod-Stambaugh Co., Pittsburg Iron Ore Co., Lake Erie Ore Co., E. N. Breitung & Co., and H. H. Brown & Co. Independent pig iron producers are evincing little interest in covering their requirements and from present indications there will be a heavy buying movement during the fall months. Eastern operators likewise have failed as yet to contract for their requirements of lake ores, although heavy tonnages of foreign ores have been purchased by these interests. While the consumption of lake ores by furnace interests has declined somewhat of recent years, nevertheless, a certain tonnage is required to enrich their mixtures. On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi Bessemer, $3.50.

Pig Iron.—The demand is limited almost entirely to small lots for early delivery. Gray iron foundries in this district are still running light and no contracts are being placed to cover future requirements, despite the recent advance in prices. Malleable and steel founders, with few exceptions, have covered their needs to the first of the year. Local furnaces continue to quote $16 for deliveries to Jan. 1, although it is possible that this price could be shaded 25 cents on a desirable tonnage. For shipment after the first half of the year, No. 2 foundry iron is uniformly held on the basis of $16, and few of the producers are anxious to take on large tonnages even at this price. The largest foundry iron producer in this section has practically sold up his entire output through the next five months. Quotations, delivered in Cleveland, are as follows:

No. 1 foundry	$16.25 to 16.50
No. 2 foundry	15.75 to 16.00
No. 3 foundry	15.25 to 15.50
No. 2 southern	16.85
Gray forge	15.15 to 15.50
Bessemer	16.40 to 16.75
Lake Superior charcoal	19.00 to 19.50
Jackson Co. 8 per cent silvery	20.05

Coke.—Quotations remain unchanged for early delivery, but coke producers are inclined to ask higher prices than have been prevailing for forward shipments. The activity of the furnaces has had a tendency to strengthen furnace coke, although foundry grades have not proportionately shared the general improvement recently recorded in the iron and steel trade. We quote spot furnace coke at $1.60 to $1.65, at the ovens, and on contracts for delivery over a period of six months, $1.80 to $1.85 is asked. High-grade, 72-hour, Connellsville foundry coke is quoted at $1.80 to $2 for immediate shipment, and $2 to $2.25 on contracts.

Finished Materials. — On Monday, July 26, the American Steel & Wire Co. announced a uniform advance of $2 per ton on nails and wire, and a similar advance was made on wire products generally. This is the second increase in prices that has been made since the $7 reduction became effective, and restores $4 of this cut. The demand for fencing throughout the west and northwest is unusually heavy for the midsummer season, and the tonnage that is being shipped from the mills is almost as large as during the spring and fall months. The building activity throughout the country is reflected in the heavy demand for nails. This week, the Carnegie Steel Co. announced the withdrawal of its quotation of 1.25c on steel bars, and advanced the price to 1.30c. On plates and shapes, a similar advance of $1 a ton was made to the basis of 1.40c Pittsburg. Practically all of the leading producers are now holding steel bars at 1.30c, and plates and structural shapes at 1.40c, although one eastern mill is quoting 1.45c on the latter products. These prices apply only to tonnage for shipment the remainder of the year.

Old Material.—The tone of the market continues to improve with a general increase in prices varying from 50 cents to $2.50 per ton. We continue to quote f. o. b. Cleveland as follows:

Old iron rails	$17.00 to 17.50
Old steel rails (re-rolling)	15.00 to 15.50
Old steel rails (under 6 feet)	15.00 to 15.50
Old car wheels	15.50 to 16.00
Old steel boiler plate	13.00 to 13.50
Malleable iron (railroad)	15.00 to 15.50
Steel axles	18.50 to 19.00
Malleable iron (agricultural)	13.50 to 14.00
Heavy steel	14.75 to 15.25
Country mixed steel	13.00 to 13.50
Low phosphorus	16.00 to 16.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$14.50 to 15.00
No. 1 busheling	12.50 to 13.00
No. 1 machine cast	12.50 to 13.00
Iron axles	18.00 to 18.50
Axle turnings	10.50 to 11.00
Machine shop turnings	9.00 to 9.50
Grate bars	11.00 to 11.50
Pipes and flues	11.50 to 12.00
Tank iron	10.00 to 10.50
Hoop and band iron	9.00 to 9.50
Sheet iron	8.00 to 8.50
Wrought drilling	9.00 to 9.50
Stove plate	11.00 to 11.50
Cast borings	7.50 to 8.00

NEW YORK.

Large Contracts for Structural Material—Brisk Buying of Pig Iron in New England Districts.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., July 27.

Pig Iron.—The situation in this district shows increasing strength in every line. So far the usual midsummer dullness has not developed and the demand for iron has shown so steady an increase that prices have been advanced by practically all producers. During the week, Oxford furnace has been blown in, and other capacity in this section will probably become operative in the early future, as stocks are very low and there is considerable delay in shipments. The volume of inquiry under negotiation shows no decrease in spite of recent advances and a very fair tonnage was closed for during the week under review. This was principally in foundry and basic, though there is a good demand for pipe iron, coke malleable, Bessemer, charcoal and low phosphorus. On No. 2X foundry the minimum is now $16.25, Eastern Pennsylvania furnace, for early shipment, and one large interest is holding at $16.75; there has been considerable buying at and slightly above the former figure. Considerable sales of Virginia iron for prompt shipment are reported at $15 furnace, but from this the price ranges down to a $14 minimum. Southern foundry has been selling actively on a $13 basis and several makers are now holding at $13.50 for August-September shipment, and $14

for the last quarter; one important sale of No. 3 foundry for August-September delivery is noted at $13 furnace. Several southern producers have withdrawn from the market. The New England district has been the scene of brisk buying during the past 10 days, particularly by textile machinery manufacturers and steel works using coke malleable and basic. The New England market is still at the mercy of Buffalo producers, whose prices have not advanced as rapidly as those of other sections. Some selling of charcoal on a basis of about $20, Buffalo, is noted. There have been no recent sales of low phosphorus, but considerable inquiry is now current and will probably result in a small advance. Pipe manufacturers continue to pick up small lots wherever they can be had and the price is steadily advancing. The chief interest in the market, however, is centered on basic, of which there has been some important selling at as high as $17, delivered Eastern Pennsylvania plants for fourth and first quarter delivery. A good volume of inquiry is under negotiation, but consumers are sounding the situation carefully before accepting the new price, which represents a clean advance of $1 per ton within a week. We quote, early and fourth quarter delivery, New York tidewater, as follows:

Northern foundry No. 1	$17.50 to 18.00
No. 2X foundry	17.00 to 17.50
No. 2 plain	16.50 to 17.00
No. 2 southern foundry	16.75 to 17.25
Malleable	17.25 to 17.75
Gray forge	16.00 to 16.50

Ferro-Alloys.—Inquiries are current on about 2,500 tons of ferro-manganese, the price on which continues in the neighborhood of $41.50 to $42, Baltimore, for early shipment. It develops that on a large block recently sold for western delivery the price was slightly lower than originally reported. Ferro-silicon for prompt shipment is still scarce and is selling at $66 to $67, Pittsburg. For forward deliveries, at present duty, the range is $62 to $63. The report that the Siegen syndicate has sold a large tonnage of spiegeleisen for shipment to this country is pronounced without foundation; the Bessemer rail making concerns are well supplied, and the leading domestic producer has an extremely large stock on hand.

Finished Materials.—The volume of structural business now being figured on is smaller than at any time for several months and few large projects are likely to develop in the near future. In spite of this, however, the situation continues strong and healthy, as specifications are coming out freely and mill interests are generally sold up for from two to four months ahead. Occasional small orders for billets are reported, chiefly specials, and a good premium is now being secured on all business taken. The demand for wrought iron pipe has been sufficiently heavy to take up the recent price advance of $2 per ton and the advance on wire and nails by the American Steel & Wire Co. is being well received. A moderate advance on bars, plates and shapes by the leading interest is anticipated, as independent interests are now practically all on a higher level. Rail mills are operating in better shape, as the bulk of the business recently placed has been for early delivery.

The American Bridge Co. will furnish about 5,000 tons of steel for the Vanderbilt Hotel on Thirty-fourth street, the contract for which has finally been placed with Post & McCord. Other local contracts include the following: Factory building on Twenty-fourth street, 800 tons, to A. E. Norton & Co.; office building at New Brunswick, N. J., 600 tons, to Passaic Steel Co., and about 1,000 tons of electrical towers for J. G. White & Co., to the Riter-Conley Mfg. Co. The Bethlehem Steel Co. will supply the beams, 800 tons, for the Twenty-second Regiment armory in this city, but the plate work has not yet been let. A large tonnage of sheet piling for the United Missouri River Power Co., Helena, Mont., will be supplied by the Jones & Laughlin Steel Co. The Roanoke Bridge Co. has taken a 400-ton highway bridge and the National Construction Co., a 400-ton addition to the Hampton Hotel at Albany. Pending contracts include 500 tons for improvements at the Brooke furnace at Birdsboro, Pa., a high school building at New Bedford, Mass., 1,600 tons; and a small tonnage for sugar mill buildings for export; the receivers of Milliken Bros. secured a 2,000-ton order of this kind a short time ago.

Railroad orders include 30 locomotives for the Missouri Pacific, taken by the American Locomotive Co., and 30 for the Denver & Rio Grande, which has also placed orders for 3,850 steel cars. Several smaller car orders are reported and a good inquiry is under negotiation. The demand from ship yards is light. The New York Ship Building Co. is in the market for its malleable casting requirements over the next year. The J. S. Marvel Co. has placed 350 tons of plates with the Lukens Iron & Steel Co. and 250 tons of shapes with the Eastern Steel Co.

Angles, 3 to 6 inches x ¼-inch and heavier, 1.51c to 1.56c; beams, 3 to 15 inches, 1.51c to 1.56c; tees, 3 x ¼-inch and heavier, 1.51c to 1.56c; plates, carloads, tank, 1.51c to 1.56c; marine boiler, 1.86c; bar iron, 1.40c to 1.45c; soft steel bars, 1.46c; sheets, No. 28, black, 2.56c.

Cast Iron Pipe.—A steady run of small orders continues, and plants in this territory are well supplied with business for some time ahead, but the price level is still barely above cost and the current market is devoid of important transactions. In the New England field, Lisbon Falls, Me., has made no award in connection with its 800-ton inquiry, So. Paris is negotiating for 600 tons and the sewer department of Attleboro, Mass., is in the market for 200 tons.

Old Material.—Holders of scrap have advanced their price ideas steadily with the higher offerings of consumers, thus keeping up the practical dead-lock which has held transactions to a minimum for several months. In this immediate district there does not seem to be any appreciable increase in the production of old material, as yards are in much the same condition as some time ago, and accumulations are not large. In large lots, heavy melting steel will bring the top prices noted below or even higher, but no quantities are on the market. The following quotations, New York delivery, gross tons, are largely nominal, owing to the absence of recent transactions:

Old steel rails (rerolling)	**$13.50 to 14.50**
Relaying rails	**19.00 to 19.50**
Old car wheels	14.50 to 15.00
Old iron car axles	20.00 to 20.50
Old steel car axles	18.00 to 18.50
Heavy melting steel	13.00 to 13.50
No. 1 railroad wrought	15.00 to 15.50
Iron track scrap	13.00 to 13.50
Wrought pipe	12.00 to 12.50
Cast borings	7.50 to 8.00
Wrought turnings	9.00 to 9.50
Heavy cast scrap	12.50 to 13.00
Railroad malleable	11.50 to 12.00
Stove plate	10.00 to 10.50
Grate bars	10.00 to 10.50

PHILADELPHIA.

Rapid Decrease in Pig Iron Stocks at Eastern Furnaces.

July 27.

Pig Iron.—The market continues its remarkable strength and developments of the week, have been uniformly favorable from the producer's standpoint. From figures collected by the Eastern Pig Iron Association it is known that, while the tonnage of orders on books has increased very heavily during the past month and considerable additional furnace capacity has become operative, stocks on furnace yards have shown a decided

decrease and the average per stack is now barely a working amount. Despite the fact that the approach of August is usually accompanied by a slowing down of buying, the volume of inquiry now under negotiation is extremely large and is receiving new additions every day. The call is extremely varied, coming from a number of the railroad shops which are in need of coke and charcoal iron, from steel works which are inquiring for basic, low phosphorus and a considerable tonnage of Bessemer, from the general foundry trade, from pipe works—in short, from almost every line of consumption in this territory. Prices are advancing steadily. On No. 2X foundry for delivery over the balance of the year $16.25, furnace, is apparently the minimum, while none of the important Virginia interests is now selling at below $14.00. The basic situation is particularly strong, important sales having been made for shipment over the first quarter of next year: on one large lot for delivery chiefly during the first quarter, but partly during the last quarter, the price is reported as $17.00, delivered, and there is good reason to believe this is correct. One good-sized lot of off-basic brought $16.25, delivered. There is a large inquiry still current and it is difficult to see where it can be met with the capacity now operating or soon to blow in. Marshall furnace is expected to go into blast within a short time. We quote, delivery at Eastern Pennsylvania plants over the balance of the year, as follows:

No. 1X foundry	$17.50 to 18.00
No. 2X foundry	17.00 to 17.50
No. 2 plain	16.50 to 17.00
Standard gray forge	15.75 to 16.00
Basic	16.50 to 17.00
Low phosphorus	19.50 to 20.50
No. 2 Birmingham	16.25 to 16.75
No. 2X Virginia	17.00 to 17.50
No. 2 plain Virginia	16.50 to 17.00

Finished Materials.—With the exception of rails, the situation shows increasing strength. Specifications on old contracts are coming in at such a rate that mills are running considerably behind on deliveries, and a satisfactory volume of new business is being booked by eastern mills on a 1.40c, Pittsburg, basis, in no case for delivery later than Dec. 31. One rather large consumer recently made a contract for structural shapes on this basis up to Oct. 1, and a 1.50c basis for the last quarter of the year, in case the mill advanced to that figure. Shipyard work is reported as generally light, but railroad requirements are heavy and some interests have made liberal advances on track supplies. It is now stated on good authority that the Baltimore & Ohio car purchase may call for a total of 10,000 cars, the number ordered during the depression some years ago. Neither the city bridge contract nor that of the Reading for the Perkiomen branch has been awarded, the Casey hotel at Scranton is still pending and nothing has been decided in connection with the Franklin Hotel in this city. The billet inquiry continues brisk and a good tonnage has been booked. We quote: structural shapes and plates, 1.50c to 1.55c; sheets No. 28, 2.80c; refined bar iron, 1.45c to 1.50c; steel bars, 1.45c to 1.50c.

Old Materials.—On good-sized lots of heavy melting steel, that is, from 2,000 tons upwards, mills have offered as high as $16.50 during the week and would be willing to book heavily at that figure, but even this advance has not brought out any accumulated material; for small lots the current offering is somewhat lower. The embargoes at two or three Eastern Pennsylvania plants have been removed. In anticipation of the early settlement of the tariff controversy, there has been some talk of an attempt to import British scrap and the matter has been looked into rather carefully. It develops, however, that present prices abroad would allow it to be laid down at seaboard plants, without the payment of any duty, at about $16.00; hence no importation movement is likely until there is a considerable further advance. We quote, eastern Pennsylvania delivery, gross tons, as follows:

Old steel rails (rerolling)	$16.75 to 17.25
No. 1 steel scrap	16.00 to 16.50
Old steel axles	21.50 to 22.50
Old iron axles	23.50 to 24.50
Old iron rails	19.50 to 20.50
Old car wheels	15.50 to 16.00
Choice scrap R. R. No. 1 wrought	18.00 to 18.50
No. 1 yard scrap	16.50 to 17.00
Machinery scrap	15.00 to 15.50
Low phosphorus scrap	20.00 to 20.50
Wrought iron pipe	15.50 to 16.00
No. 1 forge fire scrap	14.50 to 15.00
No. 2 forge fire scrap, ordinary	9.50 to 10.00
Wrought turnings	13.00 to 13.50
Axle turnings, heavy	13.00 to 13.50
Cast borings	10.50 to 11.00
Stove plates	12.50 to 13.00

BUFFALO.

Pig Iron Quiet—Another Furnace Blown In.

Office of THE IRON TRADE REVIEW, 932 Ellicott Sq., July 27.

Pig Iron.—While inquiries for malleable and basic have increased in number, the market on the whole remains quiet. Sales are limited almost entirely to lots of less than 1,000 tons. Large consumers to some extent have already covered their requirements, but prices are firm with an upward tendency. No. 2 foundry is held firmly on a basis of $15 Buffalo, and no sales have been reported at lower figures. Stack B of the Buffalo Union Furnace Co., was blown in July 21, and all three furnaces are now in operation. The Lackawanna Steel Co. is operating six of its seven stacks. We quote, f. o. b. Buffalo, as follows:

No. 1X foundry	$15.50 to 16.00
No. 2X foundry	15.00 to 15.75
No. 2 plain	14.75 to 15.25
No. 3X foundry	14.50 to 15.00
Malleable Bessemer	15.25 to 15.75
Gray forge	14.50 to 15.00
Charcoal	19.50 to 20.50

Finished Products.—The amount of new business offered is exceedingly light, in view of the fact that the mills have their output for immediate delivery practically sold up. The Carnegie Steel Co booked an order for 500 tons of steel bars for delivery within the next three months. Approximately 450 tons of structural material will be required for the new plant of the American Laundry Machinery Co., at Rochester. It is the prevailing impression in the trade that both bars and structural shapes will be advanced within the next 30 days.

ST. LOUIS.

Heavy Sales of Malleable Bessemer and Foundry Iron.

July 26.

Pig Iron.—Inquiries have been made for quite a large tonnage of southern and malleable Bessemer iron, with prices firm at $12.50 as the lowest for No. 2, Birmingham, and $15 for northern iron, with freight of $2.50 a ton to be added to the latter price. One firm reports sales in the territory last week of from 5,000 to 6,000 tons for deliveries over the remainder of the year, and also a sale of basic for delivery over the first half of 1910. Another firm insists it made sales of 5,000 tons of foundry iron and 1,000 tons of malleable Bessemer last week for last half shipment. Some of the southern furnaces are out of the market, and others are holding out for higher prices during the last quarter. The foundries report good business and some are asking that their shipments be anticipated on contracts. Our quotations, delivered, to which the freight of $3.75 a ton has been added, follow:

No. 1 southern	$16.75 to 17.25
No. 2 southern	16.25 to 16.75
No. 3 southern	15.75 to 16.25
No. 4 southern	15.25 to 15.50

Coke.—Sales of coke were made last week as low as $2.15 for 72-hour Connellsville foundry, spot delivery, and $2.25 for shipment over the remainder of the year. The minimum

figure for the first half of 1910 seems to be $2.25, ovens, with some dealers refusing to quote for this delivery. Connellsville, 48-hour, furnace coke is held at $1.75 to $2, ovens, for all deliveries. Virginia and West Virginia, 72-hour foundry is bringing $2.25 for delivery over the remainder of the year and the first half of 1910. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—Prices on scrap iron remain firm as follows, with good demand:

Cast iron borings, free from foreign material, net tons	$ 5.00 to 5.50
Steel axle turnings, gross tons	11.00 to 12.00
Steel railroad axles, net tons	17.00 to 18.00
Iron railroad axles, net tons	18.50 to 19.50
Miscellaneous steel scrap, gross tons	10.00 to 11.00
Old car wheels, gross tons	15.00 to 15.50
No. 1 railroad cast scrap, net tons	11.00 to 11.50
Heavy machinery cast, net tons	13.00 to 13.50
Stove plate and light cast, net tons	10.00 to 10.50
Sheet iron, net tons, uncut	4.00 to 5.00
No. 1 railroad wrought, net tons	12.00 to 13.00
Railroad malleable, net tons	12.00 to 12.50
Heavy melting steel, net tons	11.00 to 12.00
Relaying rails, net tons	17.00 to 18.00

BIRMINGHAM, ALA.

Idle Furnaces Will Be Placed in Operation.

Birmingham, Ala., July 26.—Southern pig iron manufacturers have sold well ahead and some of the producers have announced their withdrawal from the market on deliveries for the third quarter of the year. Prices are beginning to advance and before the end of the month, $13 per ton for No. 2 will be the minimum for delivery through the remainder of the year. There is no willingness to book business for shipment during the fourth quarter at present prices, the consensus of opinion being that there will be another advance by the time the buying for the last quarter of the year sets in. Cunsumers and pig iron selling agents have resently been visiting the southern territory, looking over the situation and getting information as to what is being done, or what is likely to be done in the future.

The Tennessee Coal, Iron & Railroad Co. will start Alice furnace (Birmingham) this week, on foundry iron. Preparations are being made to blow in the Oxmoor furnace and a little later one or two more furnaces at Ensley. Official announcement comes from President Crawford's office that practically all of the mines of the Tennessee company will be put to work on full time and the coke ovens started up. The ore mines of the company are also being put on full time. When it is taken into consideration that the Tennessee company has a large quantity of ore and coke already stacked up from the past year, there must be some strong expectations as to the iron production, if the raw material source is being further strengthened.

The announcement that the Southern Iron & Steel Co. will remove the steel rod, wire and nail mills from Ensley to Gadsden, 50 miles north of Birmingham, will not disturb the development in this immediate district. W. H. Hassinger, president of the Southern Iron & Steel Co. has awarded the contracts for the machinery for the mill to be erected at Gadsden.

An official statement tends to show that the plants of the Southern Iron & Steel Co. will be in operation about October 15. The machine shops and foundries in the southern territory are beginning to feel the effects of improved trade. The dollar per ton advance on cast iron pipe has not retarded inquiry and the pipe shops are operating in full.

The following quotations are ruling on old material:

Old iron rails	$14.00 to 14.50
Old iron axles	13.00 to 14.50
Old steel axles	12.50 to 13.00
Old steel rails	10.00 to 11.00
No. 1, railroad wrought	12.00 to 13.00
No. 2, railroad wrought	10.50 to 11.00
No. 1, country	9.00 to 9.50
Old standard car wheels	13.00 to 13.50
Stove plate	9.00 to 9.50
Heavy melting steel	10.00 to 11.00
Old steel boiler plate	8.50 to 9.00
No. 1, machinery	10.50 to 11.50
Cast borings	5.00 to 5.50

SEATTLE.

Increased Confidence Manifested by Manufacturers on the Pacific Coast.

Office of THE IRON TRADE REVIEW,
302 Pioneer Building, July 23.

Increased confidence, largely reflected from the activity in the east, is beginning to have an effect on the Pacific coast and the market is stimulated slightly. Light manufactured products are moving freely. The foundries are doing considerable light work; heavy building contracts are scarce. Considerable marine repair work is under way. The Commercial Boiler Works, Seattle, has taken an order for four Scotch marine boilers, 11 feet long and 15 feet in diameter, for the steamship Northwestern. The Heffernan Engine Works, Seattle, has contracted to build a new tail shaft for the United States transport Dix for the sum of $11,865. The lumber interests are buying sparingly of wire rope, heavy machinery or heavy railway supplies. Building operations continue active. A 13-story building requiring about 1,200 tons of structural steel will probably be erected at Second avenue and Stewart street, Seattle. Graham & Myers, Seattle, are architects.

Pig Iron.—Local stocks of foundry iron are very low. Buying for immediate delivery is fair and for future delivery slow. Southern iron has advanced slightly in the local market in sympathy with the advances at the furnaces. The foundries are operating at about 75 per cent capacity. We quote gross tons as follows: foreign iron ex-ship Columbia river or Puget Sound, domestic f. o. b. Pacific coast terminals:

English, Cleveland, No. 1, spot	$24,00 to 24.50
English, Cleveland, No. 1, to arrive Sept.	23.00 to 23.50
English, Cleveland No. 1, to arrive Dec.	21.50 to 22.50
Glengarnock, Scotch, to arrive September	25.00
Southern No. 2, domestic	23.00 to 23.50

Merchant Iron.—The market has improved slightly and the prospect is that conditions so long bad in this department will clear in the near future. One disturbing element, not yet eliminated, is the presence of considerable quantities of foreign bars imported at prices said to be as low as $1.75 base. The volume of business is good. The Portland mill of the Pacific Hardware & Steel Co. is closed for general repairs. We quote base prices per 100 pounds, f. o. b. Seattle, as follows: Common iron bars, $2.15, soft steel bars, $2.25; machinery steel, $2.75; Norway iron, $3.50; angles, channels, zees and tees, under 3 inches, $2.75.

Sheets.—The large number of small buildings under construction is maintaining the demand for sheets, particularly light galvanized stock suitable for cornices, drain pipes, etc. Sales continue heavy.

We quote as follows: Blue annealed sheets, No. 12, 2.95c; No. 14, 3c; No. 16, 3.10c; Nos. 22 to 24, 3.55c; No. 28, 3.70c. Galvanized sheets, Nos. 10, 12 and 14, 3.60c; No. 16, 3.70c; Nos. 22 to 24, 4.10c; No. 28, 4.70c.

Old Material.—Considerable quantities of old wrought iron and steel are being shipped out of this territory. The demand for foundry scrap is lighter and dealers are making some concessions in order to unload. We quote net tons, f. o. b. Seattle, as follows:

Foundry and machinery scrap	18.00 to 20.00
Old car wheels	16.50 to 17.00
Railroad wrought	10.00 to 11.00
Country wrought and busheling	5.00 to 8.00

BRITISH IRON MARKET.

Threatened Coal Strike Steadies Pig Iron Market.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, England, July 17.

In view of the slack demand, the steadiness of pig iron prices causes some surprise, the present quotation be-

ing 48s ($11.76), representing a reduction of only a few pence. This is probably explainable by the coal crisis, as a great strike is threatened in connection with the new eight hours' act. Scotch coal owners are determined to have a reduction in respect to the shortening of hours, and at present a ballot is being taken as to whether the pits throughout the kingdom shall cease work in sympathy with Scotland. The first effect of this would be to stop the buying of pig iron by the Scotch foundries, who are among Cleveland's best customers. The future is so uncertain that consumers will not buy forward, and this depresses prices. If a coal strike comes, furnaces will probably have to be damped down. A recent report shows 53 Cleveland blast furnaces in operation, or five fewer than this time last year, while the report for the June quarter shows an output for the district of 527,000 tons, which is less by 43,000 tons than this time last year. The amount of iron in stock in the Connal's stores is 246,157 tons, which is the heaviest amount since 1905 and 200,000 tons more than a year ago. In spite of the outlook, the Cleveland makers are in no hurry to sell for autumn delivery, which shows a fair amount of confidence. Pig iron was slightly weaker at Birmingham this week, Northampton and Derbyshire selling at 45s ($11.04) and 46s ($11.28), respectively. The hematite trade is most unsatisfactory, mainly on account of the dullness in the steel trade. Mixed numbers on the east coast are 55s ($13.46), and it is commonly reported that the hematite trade is unremunerative in view of the poor price and the heavy cost of raw material.

METAL MARKETS.

ST. LOUIS.

July 26.

Lead and Zinc.—The best prices paid for zinc ore in the Missouri-Kansas-Oklahoma district last week were $44 for 60 per cent ore and $47 for 63 per cent ore. There is not much demand. Buyers have orders to purchase at the lowest figure obtainable. However, the production is curtailed by reason of flooded mines, and while there is not much likelihood of better quotations being realized this week, producers are not without hopes. Extra pumps have been installed in many of the mines for the purpose of hastening the draining process. That the final outcome of the zinc tariff, affording a graded scale protection to the district up to one cent a pound on metallic contents will have the effect of decreasing shipments of Mexican ore to the United States, thereby producing a better demand for home ores is doubted by few operators in the district. St. Louis spelter, which closed at $5.27½, is believed to have accounted, in some measure, for the weak ore market in the Missouri-Kansas-Oklahoma district. Calamine was steady at $20 a ton for 40 per cent ore. Lead ore brought $56 a ton for 80 per cent. The low grades were sold only on an assay basis and the higher ones for $56 flat. This was $1 a ton better than the highest price reported for the preceding week. St. Louis pig lead, Saturday, was quoted at $4.25.

CHICAGO.

July 27.

Sentimentally, metals are stronger. There was a fair amount of buying last week, especially of copper. Commitments continue to be for short deliveries, however. We quote:

Lake copper, carload lots, 13¾c to 14c; casting copper, 13⅛c to 13¼c; smaller lots, ¼c to ¾c higher. Spelter, 5.35c to 5.40c; lead, desilverized, 4.35c to 4.40c in 50-ton lots; corroding, 4.60c to 4.65c in 50-ton lots; car lots, 2½c per 100 pounds higher; sheet zinc, $7 list f. o. b. LaSalle in car lots of 600-pound casks; pig tin, 31c to 31½c; Cookson's antimony, 10½c; other grades, 9¾c to 10¼c.

Old metals are nominally unchanged in price, and there is very little life to the local market. We quote as follows:

Copper wire, 11¾c to 12c; heavy copper, 11½c to 11¾c; light copper, 10¾c to 11c; heavy red brass, 10¾c to 11c; heavy yellow brass, 8½c; light brass, 6¼c; No. 1 red brass borings, 9c to 9¼c; No. 1 yellow brass borings, 7¾c; brass clippings, 8¼c; tea lead, 3.60c; lead scrap, 3.90c; zinc, 3.60c; tin pipe, 24½c; tin foil, 23c; pewter, 17½c; electrotype plates, free from wood, 4c; electrotype dross, 2.90c; stereotype plates, 4⅛c; stereotype dross, 3c; prime slab zinc dross, $60 per ton.

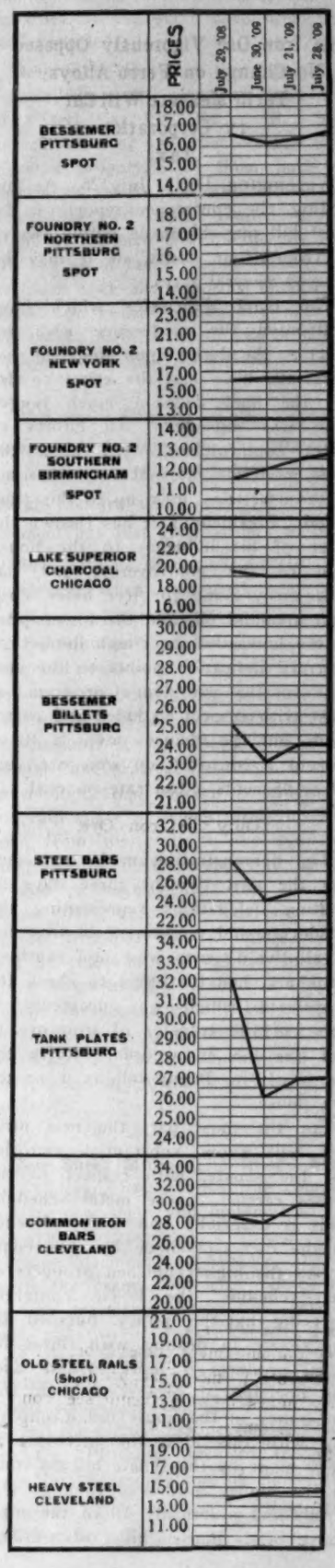
NEW YORK.

July 27.

Prices of non-ferrous metals at the close of business Tuesday were as follows:

Copper, lake, 13⅜c to 13½c; electrolytic, 13c to 13⅛c; casting, 12⅞c to 13c; pig lead, 4.30c to 4.35c, New York; pig tin, 29⅛c to 29⅜c; spelter, 5.35c to 5.40c; antimony, Cookson's, 8⅜c; Hallett's, 7⅝c; outside brands, 7⅜c to 7½c.

PRICE CHART.



METAL SCHEDULE

PRACTICALLY AGREED UPON BY THE CONFERENCE.

Free Iron Ore Vigorously Opposed—No Change on Ferro Alloys—Tariff Measure Will Carry Corporation Tax.

Washington, D. C., July 26.—At this writing, the conference report on the tariff bill may be made within twelve or twenty-four hours, or it may be delayed several days.

The chief difficulties which have confronted the conference with respect to the duties upon so-called raw materials, have had the effect to delay the final decision much longer than was expected. All efforts to effect compromises, even upon the most moderate rates of duty on some of these articles, have up to this time failed. President Taft has thrown the force of his influence to the house side of the controversy, and has tenaciously clung for free hides, coal, iron ore, and oil, and the lower rates of the house bill on rough lumber.

Every indication points to the success of the president's program, at least with respect to hides and petroleum, but the chances favor a 10 or 15-cent a ton rate on iron ore, and 40 or 45 cents a ton rate on coal.

Duty on Iron Ore.

The demonstration made here during the past two or three days by visiting delegations representing the producers and consumers of iron ore in all the districts west and south of Pittsburg, had the effect to check the movement which was decidedly in favor of the transfer of iron ore to the free list, in accordance with the terms of the Payne bill as it passed the house.

For the most part the new tariff bill will show substantial victories for the senate, with respect to the duties carried in the metal schedule. This is especially true with reference to the increases made by the senate on all the higher finished products of that schedule, the house conferees agreeing that the policy pursued by the senate in dealing with these finished products is more in line with the doctrine of protection than was the policy of the house bill. Comporting with this idea, the increases in rates made by the senate bill on some of the higher grades of tonnage materials and practically all of the rates above the house bill on cutlery, razors, and kindred articles, have been agreed to.

Whether any favorable results will come from such action or not, and that is extremely doubtful at this time, there is no mistaking the fact that an important demonstration has been made against the policy adopted by the senate in imposing what is regarded as unnecessarily high duties upon the ferro alloys. While it is admitted, even by those who have opposed the duties imposed on some of the higher grade alloys, that some increases would be justified in the interests of the domestic industry, it is believed that the rates have gone far too high in the senate bill, and are so liable to remain as that bill proposed them and that the iron and steel industry throughout the country except the larger corporations, will suffer considerably as the result of these increases in duties.

Ferro Alloys.

Every effort has been made to bring the facts in regard to the changes in rates on the ferro alloys sharply to the attention of the conferees, and even to that of President Taft himself. The detailed facts regarding the manufacture of these alloys in this country and in Canada, the situation with respect to the patents covering the manufacture of certain of the alloys, and the development of the industry in the Virginias and one or two other sections of the country, have been laid before President Taft and the conferees. It has been shown that this is one of the cases, of which there are many in connection with this tariff revision bill, wherein owners of patents upon modern processes in production, fearing that they are to lose the field as the result of the expiration of patents, have pounced down upon the tariff makers with demands for higher duties, in order to secure the owners of the patents against foreign competition.

The unfortunate part of this matter appears to be that while President Taft has leaned toward the side of lower duties generally, he has declined to take any part in the details of the bill, or to express any wishes with respect to particular schedules. The farthest he has gone in this direction is to take the side of the house on the question of free raw materials. In view of this situation, it is doubtful that the influence of the executive will be exercised in dealing with what might be called a minor feature of the metal schedule, important as that feature may be to the iron and steel industry of the country. Fear is expressed, nevertheless, that if the paragraphs relating to the alloys shall go through substantially as proposed by the senate bill, there will be vigorous protests from all parts of the country soon after the new law is in effect. Practically the only change made in the senate rates, having any bearing upon the basic metals, is a reduction in the rate on tungsten ores, which is regarded as of comparatively little importance.

Those features of the tariff bill which are known to have been agreed to, carry for the most part the rates of the senate bill, even the increases by that bill over the house bill.

Corporation Tax.

Of the general provision of the bill, the corporation tax section has been agreed to, notwithstanding vigorous protests on the part of the house conferees. This form of tax is carried into the tariff bill upon the urgent request of President Taft. As a result of the stand taken by the president in this matter, the corporation tax clearly becomes an administration measure. The representatives of the house in the conference have stoutly resisted this form of taxation, and some of them registered their protests against any form of income tax by voting against the resolution for a constitutional change admitting of an income tax. The most important change made in the corporation tax by the conferees is a reduction in the rate of taxation from 2 per cent to 1 per cent. It is understood that the limitations of the corporation tax question as it passed the senate have been retained, both in respect to the $5,000 net income of corporations, and the exemptions covering corporations not organized for profit.

Maximum Tariff and Drawback.

The maximum tariff provision of the senate bill, with a 25 per cent increase in duties against foreign countries that shall discriminate against the trade of the United States, has been agreed to in substantially the form it appeared in the senate bill. The customs court provision is also approved by the conference, with a change requiring the court to be located in Washington, rather than in New York City. The tentative agreement upon the drawback provision restores the drawback of the Dingley law, with some additions to encourage manufacturing in bonded warehouses.

ARTHUR J. DODGE.

EARNINGS

Of the Steel Corporation Increase During the Second Quarter—Large Tonnage of Unfilled Orders.

The directors of the United States Steel Corporation, at a meeting held in New York City, July 27, ordered an increase in the dividend of common stock so as to put the stock on a 3 per cent basis, instead of a 2 per cent basis as heretofore.

The total earnings of the company for the quarter ended June 30 were $29,340,491, after deductions for all expenses of operation, repairs, maintenance and employes' bonus fund, interest on bonds, and fixed charges of subsidiary companies. The net earnings, after deducting $506,096 for sinking funds on bonds of subsidiary companies, and $5 511,000 for depreciation and reserve funds, were $23,323,395.

Interest on United States Steel Corporation bonds amounted to $5,911,862. The sinking fund for the quarter on the same bonds amounted to $1,012,500, and the interest on bonds in the sinking funds were $387,601, making a total for the two items of $7,311,963. Deducting this from the net earnings leaves a balance of $16,011,432.

The amount of dividend on preferred stock for the quarter at 1¾ per cent was $6,304,919. The dividend on the common stock for the quarter at ¾ per cent is $3,812,269. The total dividend item is $10,117,188, leaving a surplus for the quarter of $5,894,244.

The preferred dividend is payable Aug. 30, 1909. Books close Aug. 5 and reopen Aug. 31. The dividend on common stock is payable Sept. 30, 1909. The books close Sept. 9 and open Oct. 1.

A striking feature of the statement for the quarter is the earnings from month to month. In April they were $8,163,344; in May, $9,661,228, and in June, $11,516,019, showing a steady increase which was accelerated as the summer approached.

Unfilled orders on June 30 amounted to 4,057,936 tons, compared with 3,542,595 March 31.

Following is a comparison of the earnings for the first and second quarters of this year:

	2d quarter.	1st quarter.
Net earnings	$29,340,491	$22,921,268
Sinking fund—subcos.	506,098	272,533
Dep. and reserve	5,511,000	3,463,666
Total	6,017,096	3,736,199
Balance	23,323,395	19.185,069
Interest on bonds	7,311,963	7.311,963
Available for div.	16,011,432	11,873,106
Pref. div.	6,304,919	6,304,919
Balance	9,706,513	5,568,187
Common dividend	3,812,269	2,541,513
Surplus	5,894,244	3,026,074

A comparison of the half year ending June 30 and the corresponding period in 1908 follows:

	1909.	1908.
Net earnings	$ 52,261,759	$ 38,494,761
All interest	24,377,221	20,598,437
For dividends	27,884,538	17,896,324
Dividends pref.	12,609,838	12,609,838
Balance	15,274,700	5,286,486
Common dividend	6,353,782	5,083,026
Surplus	8,920,918	203,460
Final surplus	8,920,918	203,460
Previous surplus	133,415,214	122,645,244
Total surplus	142,336,132	122,848,704

A comparison by months of the earnings in the first and second quarters of 1908 and 1909 is as follows:

SECOND QUARTER. Month.	1909.	1908.
April	$ 8,163,244	$ 6,761,680
May	9,661,220	6,021,279
June	11,516,019	7,482,797
Total	$29,340,491	$20,265,756
FIRST QUARTER.		
January	$ 7,262,605	$ 5,052 743
February	7,669,336	5,709,428
March	7,989,327	7,466,834
Total	$22,921,268	$18,229,005
Six months	$52,261,759	$38,494,761

TIN PLATE MILLS

Resume Operations With Non-Union Men—Butler Strike Settled.

Important developments in the labor situation which is now having considerable bearing upon some branches of the iron and steel industry have been lacking the past week. The American Sheet & Tin Plate Co. is gradually increasing its working forces with non-union men in some of the tin plate plants which have been struck by the Amalgamated Association of Iron, Steel and Tin Workers, because of the company's declaration for the open shop. The principal gain in the company's tin mill activities has been made at the American works at Elwood, Ind., and at the Greer and Shenango plants at New Castle, Pa. Although these three large plants, with a total of 78 hot mills, have only a small percentage of their capacity in operation, or about 18 mills, the running schedules are being slowly increased as more non-union men are being added to the crew. At the New Kensington, Pa., plants, which have been non-union as to their rolling departments, but were affected by the strike of the tin house employes, the mills are resuming with non-union crews. The sheet mill activities of the American Sheet & Tin Plate Co. have not suffered specially from the strike, as a very few of the plants are unionized. The operations of the company in its sheet mills at present are now at about the same stage at which they were interrupted by the strike, or about 75 per cent of total capacity.

Quietness and order have ruled in the strike against the Pressed Steel Car Co., McKees Rocks, Pa., although the plant is still under the protection of the state constabulary and special deputies. Thus far the officials of the company have made little effort to bring in outside workmen, being warned against this by the authorities, and the activities of the plant have been seriously crippled.

Despite the fact that the majority of the strikers at the plants of the Standard Steel Car Co., Butler, Pa., have agreed to terms with the company, only a small proportion of them have returned to work and the works are being operated with limited forces. Many of the men now out declare they are restrained from resuming their employment with the company because of threats of violence from the minority among the strikers which has been dissatisfied with the settlement.

Will Build Furnace.—Many improvements and extensions to the Monessen, Pa., plant of the Page Woven Wire Fence Co. are under way. The management has just given orders to build another 60-ton, basic open-hearth furnace, and when completed, the Page company will be self-sustaining, the steel production then being equal to its rod mill capacity. This new furnace will be a duplicate of the one built last year and which has given such splendid satisfaction. It will doubtless take six months time to erect this large furnace. In addition, this concern is building a rod mill conveyor which takes the wire rods from the reels in the rod mill and conveys them through an underground passageway to the cleaning house. This, heretofore, has been done by an overhead electric crane which will be removed and will be installed on a long runway to serve the open-hearth furnaces and will be equipped to handle scrap by the use of an electric magnet. The galvanizing and special process equipment is also being extended.

New Sheet Mills.—The Inland Steel Co., Chicago, has awarded the contract for its new sheet mill buildings to the Morava Construction Co., Chicago. The Alliance Machine Co., Alliance, O., secured the crane contract. There will be four travelers, one 35 tons, one 25 tons, and two of 5 tons capacity each. The Mesta Machine Co., Pittsburg, was awarded the contract for a cross-compound condensing engine, 34 and 60 x 60, and the United Engineering & Foundry Co., Pittsburg, received the contract for the eight finishing mills with necessary roughing mills, four cold rolled mills and the mill shears.

METAL EXCHANGE.

New Rules to Govern Sales of Copper, Spelter and Lead.

Following the vigorous attack upon its methods by the investigating committee appointed by Governor Hughes, the New York Metal Exchange has decided to inaugurate many reforms. A new set of rules has been promulgated by the board of managers to take effect Aug. 2, under which the old method of making quotations by the arbitrary decisions of a committee will be abolished and quotations will be made by actual sales or bids.

All dealings in copper under the new rules are to be confined to "standard copper," and no other copper shall be quoted. The minimum on contracts shall be 25 tons of 2,240 pounds. The seller has the option to deliver any of the four classes following:

A. Refined copper assaying not less than 99 per cent and below 99.30 at contract price.

B. Refined copper assaying not less than 99.30 and below 99.58 at ⅛ of a cent above contract price.

C. Refined copper assaying not less than 99.80 at ¼ of a cent above contract price.

D. Rough copper subject to a rebate of ⅜ of a cent per pound from contract price.

The three grades of refined copper take the place of the old grades of casting, electrolytic and lake copper upon which quotations used to be made. Formerly the secretary was not permitted to make public any offer or sale made on the exchange. That rule is now abolished and the quotations for standard copper are to be based upon public transactions.

Other changes in the rules make the minimum quantity of pig tin to be dealt in five tons instead of ten, and make deliveries of lead and spelter good either in New York or East St. Louis.

Spelter and lead have not been traded in in New York for years because St. Louis is the center of the lead country and the metal is stored there and not in New York.

COLLAPSE OF SHEET COMBINE.

British Galvanized Sheet Association Dissolved—Prices Decline.

Birmingham, Eng., July 20.—Announcement has just been made of the collapse of the Galvanized Sheet Association and as a result, prices have sharply declined. The association was founded several years ago on the initiative of one of the largest houses, and there was some dissatisfaction at the time on the ground that penalties were imposed for restriction of output beyond the production then prevailing. Obviously, this was in favor of one or two great firms which, prior to the combine, had enormously extended their plants. But the smaller houses were induced to join partly by the prospect of high prices, but also by the fear that they would be coerced by the large establishments. For a long time the combine had an extraordinary run of success, and during the depression rigidly maintained its selling figure of £12-10 per ton, in spite of the heavy reduction in every description of iron and steel. Black sheets, for instance, were reduced fully £1-10 per ton and thus greatly increased the profit to galvanized makers. The success of the association frequently caused envious comments among those subjected to unrestrained competition.

It is admitted that American manufacturers were large factors in bringing about the collapse through their severe competition in South American markets. The high prices have also brought British competitors into the field who have split up the orders, and the Black country unassociated houses have, by quoting 5/ or even 2/6 below combine prices, carried off big orders and kept their mills in full employment while the associated plant has been idle occasionally to the extent of 50 per cent. Charges have also been bandied about of underhand dealing between makers in evading price agreements by means of commissions, etc. The end came at a meeting in London when the price agreement was formally abandoned and manufacturers were left at liberty to fix their own rates and produce as much as they pleased. The galvanized sheet trade, prior to the combine, was a kind of cockpit of reckless competition, and the disorganization of prices is expected to be very severe for some time to come. The collapse has merely confirmed the universal experience in Great Britain, that under existing conditions, especially with a free trade policy, price regulating combines of a permanent character are an impossibility.

The McDowell Foundry Co., Chicago Heights, Ill., has been incorporated with a capital stock of $50,000. The incorporators are Irvin McDowell and Hanson McDowell. A foundry, 125 x 150 x 75 feet will be built. The company will do a jobbing business in gray iron and semi-steel castings, and will have an output of 20 tons daily. The firm is in the market for al classes of foundry equipment.

ORE MINES

On Mesabi Range Temporarily Out of Commission.

The lake trade is, and forever will be, marked by unforeseen circumstances since the elements play so large a part in it. A cloudburst on the Mesabi range placed several mines temporarily out of commission as well as crippling the Duluth, Missabe & Northern railway, while a washout on the Chicago & Northwestern has prevented any shipments from the Menominee range, via Ashland where vessels have been waiting for days to complete their cargoes. Prior to the storm, ore was moving with remarkabel facility, easily in excess of 6,000,000 tons per month, but now it is likely to fall a little under this figure for July. Meanwhile the trade is seriously deranged. Vessels are waiting at both ends and there is much congestion. The situation is aggravated too by the fact that there are more vessels now offering than cargoes. The sudden increase in ore shipments had called out quite a number of vessels which now find themselves with nothing to do as the coal trade continues to be a thing of promise and not of performance. The expected improvement in this trade has not developed, but it would seem as though it could not be much longer delayed as the northwest will certainly need far more coal than it is getting.

All these conditions make however, far better times later in the season. The demand for ore is pretty sure to increase as new furnaces are steadily going into blast and is probably now within 10 per cent of what it was before the panic of 1907. So sure are some of the vessel owners of a lively fall that they are predicting dollar ore before the season closes, but it must be confessed that the vessel owner who sees dollar ore is a delightful optimist. Such a harvest is not likely to be reaped on the lakes again; but it is reasonably certain that everyone will be busy in the fall.

It is generally admitted, too, that 1910 will be a very busy year, probably moving 50,000,000 tons of ore, and one may therefore look forward with confidence for orders for new ships. Three have already been let for 1910 delivery and additional announcements are expected in the near future. Some predict that the new orders may reach as high as twenty.

The steamer J. S. Ashley, will be launched at the Lorain yard of the American Ship Building Co., Saturday.

FOREIGN IRON ORE.

(Continued from page 181.)

the tonnage of local and foreign ores available for eastern furnace plants in 1910 will be considerably larger than that of the current year, for which the selling of Spanish product was in the neighborhood of 300,000 tons, of Newfoundland about 200,000 tons and of lower Russian perhaps 100,000 tons. Since these sales were made late last year, two eastern interests have taken on about 135,000 tons of a high grade Swedish product and there has been some light selling of Cuban ore aside from that imported by the two steel works interested in the deposits of that island. As yet, nothing definite is known as to the tonnage of Spanish ore which will be offered in this country for 1910, but it is safe to assume that it will be at least as large as that for the current year. Extensive development work at the Newfoundland deposits means that their output during 1910 will be materially larger and that eastern furnaces will share in the increased tonnage. Swedish importations during the coming year, however, are likely to be no heavier, as these ores normally find a ready market nearer home and a long-term shipping charter recently closed indicates that for some time they will enjoy a larger consumption in German blast furnaces. Nothing is known as to the possible Russian supply for this country, but the merchant Cuban offering will probably not show any important increase.

Increased Importation from Cuba.

While importations from Cuba can be expected to show materially increase during the coming year, this will practically all be utilized by steel-making interests. The development work of the Spanish-American Iron Co. (Pennsylvania Steel Co.) on the north coast has reached such a stage that heavy shipments will be possible during the year. The improvements in ore handling facilities at the Philadelphia docks of the Reading, which has been badly congested by the heavy import movement, will probably be completed by January 1.

As regards domestic production, the outlook is distinctly for a materially larger output. The Adirondack magnetite workings, which are the most extensive operations in the East, recently begun important development work and are now installing additional equipment which will result in a much larger tonnage being available for 1910; these mines are now producing at the rate of about 800,000 tons of shipping material—crude ore and concentrates, per year. There is also increased interest in the deposits of titaniferous magnetites, located at Lake Sanford, some 40 miles west of Lake Champlain, where an enormous tonnage is available for cheap mining. These deposits were recently inspected by Charles M. Schwab and other eastern furnacemen; their distance from railroad facilities, however, precludes the possibility of them becoming important producers for a considerable time.

Eastern Ore Mining Operations.

Further west, in upper New York, the mines of the Salisbury Iron & Steel Co., on which it is stated that fully $1,000,000 has been expended, will begin shipments in the early future; a concentrating plant has been installed and railway connections have been secured. The Benson mines have also been the scene of important development work, including the installation of a nodulizing plant.

In lower New York and New Jersey mining operations are now at capacity. The Forest of Dean mine, only a short distance up the Hudson from New York, has worked up to a capacity of perhaps 60,000 tons annually. The Richard mine of the Thomas Iron Co., rated at a maximum of 100,000 tons annually, is running full, as are also the mines of the Empire Steel & Iron Co., with a capacity of about 300,000 tons per year. The latter company is developing its Mount Hope, N. J., deposits toward Hickory Hill, where contracts have been let for the sinking of a new slope, as the result of diamond drilling and a careful survey of the property.

Manufacturers' Exchange.—The New York, New Haven & Hartford and the New York Central railroads announce that plans are complete for the erection of two buildings in New York city to be used as a merchants' and manufacturers' exchange at a cost of $6,500,000. They are intended to serve as sample sales rooms for manufactured goods throughout the country. The buildings will occupy two lots, each 200 x 275 feet, and a total floor space amounting to 30 acres will be available. The buildings will cover the entire space between Forty-sixth and Forty-eighth streets between Lexington avenue and Depew place.

The Pullman company declared the regular quarterly dividend of $2 per share, payable Aug. 16, to stockholders of record July 31.

SLICK STEEL WHEEL.

Plant to be Equipped for Its Manufacture by the Carnegie Steel Co.

Contracts have been awarded by the Carnegie Steel Co., Pittsburg, for the remodeling and equipping of the deck plate building of the armor plate department of the Homestead works for the manufacture of the Slick steel wheel which is the invention of Edward Slick, chief engineer of the company. For some time the company has been conducting experiments with the Slick wheel at the Homestead works which have demonstrated its possibilities and the determination to equip a plant for its manufacture is the first attempt to place the invention upon a commercial basis.

The wheel is made on mills designed by Mr. Slick. The equipment for the new plant will be built by the Morgan Construction Co., Worcester, Mass., under the direction of the inventor.

INCREASED STRENGTH.

(Continued from page 181.)

roads: C., B. & Q., 500 refrigerator cars; Northern Pacific, 2,000 box cars; New York Central, 2,500, and the Baltimore & Ohio, 5,050 cars. The tonnage of standard section rails placed with the western mills totals 11,000 tons, while the Denver & Rio Grande has placed 3,000 tons with the Carnegie Steel Co., to insure early delivery.

Cast Iron Pipe Buying

Orders for cast iron pipe, placed in the west, aggregate 5,000 tons, including 2,350 tons from Milwaukee. A number of large contracts for wrought steel pipe are pending, including 10 miles of 16-inch for a Pittsburg gas line, and 60 miles of 8 and 10-inch for Buffalo. An advance in the prices of steel pipe is now being considered.

Structural Material

The revival of building activity is reflected by the large number of contracts for structural steel placed during the week, involving approximately 50,000 tons. The Vanderbilt hotel, New York city, will require 5,000 tons, and Chicago and contiguous territory reports a total of about 6,000 tons. A large tonnage of sheet piling for shipment to Montana was placed with the Jones & Laughlin Steel Co.

DUTY ON IRON ORE

Will Probably be 15 Cents a Ton—Protest Against Free Ore.

(Special Telegram.)

Washington, D. C., July 27.—A delegation of iron ore producers and pig iron manufacturers called on President Taft today to urge that no reduction be made in the rate on iron ore below the rate in the senate bill, which is 25 cents a ton. The delegation consisted of representatives of all the independent Lake Superior ore interests, including 10 Cleveland firms; W. P. Snyder & Co., Pittsburg; Ohio ore concerns outside of Cleveland; Buffalo and Philadelphia iron sand steel concerns, and representatives from New York and Virginia. Reports from the conference room indicate an agreement upon a 15-cent rate. A. J. Dodge.

LARGE TONNAGE OF STRUCTURAL STEEL.

(Special Telegram.)

New York, July 28.—Structural orders during the past week aggregated approximately 50,000 tons. The American Bridge Co. has booked 2,000 tons for a building to be erected in this city, and 800 tons for an addition to the Oliver building, Boston. Rail orders booked by the Carnegie Steel Co. amount to 4,500 tons, and the Illinois Steel Co. 3,000 tons. A number of large inquiries have been received by the rail mills.

The Carnegie Steel Co. has started the last of its blast furnaces of its Isabella group and is now blowing 51 of its total of 59 stacks. The idle furnaces are Columbus two, Edith, Neville Island, one Duquesne, Steubenville, Zanesville and Niles.

Spang, Chalfant & Co., Inc., Pittsburg, manufacturers of tubular goods, have started operations in their new, No. 3, lap-weld furnace which will produce pipe in sizes from 4 to 8 inches. The large, No. 4, lap-weld furnace, which is under construction, will also be completed shortly. This furnace is designed to roll pipe up to 16 inches in diameter. Spang, Chalfant & Co., throughout the past year, have been making extensive improvements to their plant which have given them a considerably enlarged capacity.

The strike of a number of the workmen at the Butler, Pa., plant of the Standard Steel Car Co. was virtually ended Monday, July 26, when the employes returned to work. An agreement between the company and the men had been reached several days previous, but a number of the workmen were restrained from resuming their employment through fear of violence from the minority of their number, dissatisfied with the terms of settlement.

MILLS SIGN IRON SCALE.

(Special Telegram).

Pittsburg, July 28.—The controversy between the puddlers and iron manufacturers has been practically settled, a number of concerns having signed the scales of the Sons of Vulcan. The mills idle since July 1 are now resuming operation. Two thousand tons of forge have been sold at $14, furnace, for third quarter delivery; 800 tons of No. 2, sold at $15.50 furnace.

The transportation, supply, coal and coke departments at Pittsburg of M. A. Hanna & Co., Cleveland, have been moved from the Lewis block to the sixth floor of the Peoples' National Bank building, where the pig iron sales office, in charge of Eliot A. Kebler, is now located.

The transmission dynamometer invented and patented by Prof. W. H. Kenerson, and illustrated and described by him in a paper read before the meeting of the American Society of Mechanical Engineers, held at Washington, in May last, is being manufactured and placed on the market by the Builders Iron Foundry Co., of Providence, R. I.

PERSONALS.

Irving H. Reynolds, general manager of the Wm. Tod Co., Youngstown, is now on a six weeks' auto trip through the Adirondacks.

William M. Clyde, formerly of the Clyde Steamship Co. has been elected a director of the Sloss-Sheffield Steel & Iron Co., Birmingham, to fill a vacancy caused by the death of F. H. Olcott.

Stanley A. Easton has been elected president of the Coeur d'Alene Iron Works, Wallace, Idaho. Mr. Easton was formerly superintendent of the Bunkerhill and Sullivan mine at Kellogg, Ida.

M. S. Smith, for several years manager of the Decatur Furnace Co., Decatur, Ind., has resigned to take a similar position in New York. He will be succeeded by R. D. Meyers, of Lawrenceville, Ill.

J. C. Maben, president of the Sloss-Sheffield Steel & Iron Co., Birmingham, has sailed for Europe. Before he went he gave out a statement saying that he was leaving the company in as good physical shape as it had ever been in its history.

Walter P. Rosen, of Landenburg, Thalman & Co., has been made a member of the executive committee of the Southern Steel Co., Birmingham. Another member has been added to the committee, but the company has not yet announced his name.

Jay F. Hoover, who has been manager of the Cleveland office of the Nernst Lamp Co. for the past five years, has been appointed special agent of the company, with headquarters in Pittsburg. The Cleveland office is now in charge of J. B. Mitchell.

John J. Slattery, for 29 years president of the Todd-Donigan Iron Co., Louisville, Ky., has retired, and Richard W. Donigan, formerly vice president of the company, succeeds him. Mr. Slattery was in the iron business in Louisville for 52 years, beginning with the Louisville Rolling Mill Co. in 1857. Mr. Slattery remains as one of the directors of the company.

Horace W. Wilson, Sterling, Mass., completed 50 years of service in the wire business July 12. He began as a drawer of music wire, and 30 years ago became sales manager for that product, a department of the business which he still superintends for the American Steel & Wire Co., at Worcester, Mass. The occasion was celebrated at the North works of the company at Worcester, and Mr. Wilson was presented with a gold watch. He also received a letter and a check from the president of the company, William P. Palmer, Cleveland.

OBITUARY.

Robert Pitcairn, a well-known railroad manager, died at his home in Pittsburg, July 25, at the age of 73 years. He first became an employe of the Pennsylvania railroad in 1849, in the humble capacity of messenger boy, through the solicitation of his friend, Andrew Carnegie, who was then occupying a similar position. By successive steps he was advanced, until following the civil war he was sent to Pittsburg as superintendent of the Pittsburg division, succeeding Andrew Carnegie, who had resigned to devote his attention to his personal interests. In 1902, the office of assistant to the president was created and Mr. Pitcairn was elected to fill the position. His retirement took place three years ago. In addition to his railroad activities he was interested in various industrial enterprises and served as vice president of the Westinghouse Airbrake Co. Mr. Pitcairn's birthplace was at Johnstone, Scotland.

Steel Stocks Continue Strong

The week in the stock market was marked by set-backs as a result of liquidation, but there was no pronounced decline, as the tendency was checked by numerous upward turns. Steel shares continued to be a prominent feature. On Monday Crucible continued to advance, preferred rising to 79 and common to 11¾. There were no sensational advances on the New York exchange Tuesday. Pressed Steel Car advanced in spite of the strike. Union Switch & Signal made a new high record, reaching 101½. Crucible Steel common worked up to 12½, but soon reacted, closing at 11⅝. On Wednesday, Union Pacific advanced to 199½, which was a new high record, but closed with a loss from the record of the day. LaBelle Iron & Steel gained 3¼, and United States Steel reacted to 70½, the loss being 1¼ for the day. Thursday was marked by the merger of the Central District & Printing Telegraph Co. and the Bell system, with the American Telephone and Telegraph Co. The merger was arranged on the basis of 135 for Bell stock and 144 for the American company. Friday, Pittsburg Coal issues were active in both Pittsburg and New York exchanges. Preferred advanced to 51, a gain of 1½. Central District Printing & Telegraph rose to 132, a gain of 5 points. Saturday trading was narrow in New York, business being largely professional. Quotations kept up to the level of the day before, Union Pacific being the feature. Reports received at Chicago lead to the expectation that the crop of winter wheat will reach 400,000,000 bushels. Weakness was the striking feature of the wheat market during the week.

Money on call during the week was again from 2 to 1½ per cent and time money became gradually firmer. It was obtainable freely, but in cases where there was any difference of opinion between borrower and lender, the concession on the rate was usually from the borrower. Exports of gold from New York for the week were officially reported at $6,752,500, all of which, with the exception of $2,500, was shipped to Argentina. Bank clearings for the United States during the week were about 1 per cent heavier than the week before, and $560,000,000, or 55 per cent higher than the corresponding week last year. Total bank clearings for the week were estimated at $3,049,525,659. The actual report of clearing house banks showed loans increased $10,944,300; deposits increased $11,512,200; surplus decreased $1,125,950; ratio of reserve, 27.4 per cent. Commercial failures for the week were 264, against 237 last week, 196 the preceding week, and 289 the corresponding week last year. Shares were sold to the number of 3,478,974, as compared with 1,854,833 the preceding week, and 4,858,127 the corresponding week last year. Railway and miscellaneous bonds, exclusive of government bonds, were sold to the amount of $18,823,000, as against $20,890,000 the week before, and $23,460,000 last year. The number of immigrants coming through Ellis Island last week was 16,895, which was offset by 5,729 steerage passengers leaving. Total arrivals for the first six months of the year were 534,124, which compared with 192,657 the first half of last year.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. July 24	Changes in week	Date 1909 Ann.	M't'g.	Stock Outstanding	Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	15	+ ⅛	Sept.	2	$19,820,000		.....	.....
Allis-Chalmers, pr	52¾	+ ¾			16,150,000	7 cum	1¾ Q.	Feb., 1904
American Can	11⅞	+ ⅜	Feb.	2	41,233,300		.....	.....
American Can, pr	82¾	+1¾			41,233,300	7 cum	1¾ Q.	July, 1909
Am. Car & Foundry	62¾	+2⅝	June	24	30,000,000		½ Q.	July, 1909
Am. Car.& Fdy., pr	119	+ ¾			30,000,000	7 n. c.	1¾ Q.	July, 1909
American Loc	62½	+1⅜	Oct.	19	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	120¼	+1¼			25,000,000	7 cum	1¾ Q.	April, 1909
American Ship	58¼	.....	Oct.	13	7,600,000	4	1 Q.	June, 1908
American Ship, pr	107	.....			7,900,000	7 n. c.	1¾ Q.	Oct., 1908
Am. Steel Foundries(new)	55	+ ¾	Dec.	2	17,184,000		.....	.....
Am. Steel Foundries, pr	47½	.....			17,240,000	6 cum	1	Aug., 1904
Barney & Smith	30	.....	June	1	2,000,000	4	1 Q.	Sept., 1907
Barney & Smith, pr	95	+1			2,500,000	8 cum	2 Q.	June, 1908
Bethlehem Steel	30	—1½	April	6	14,862,000		.....	.....
Bethlehem Steel, pr	60¼	— ¾			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	43	.....	March	16	45,000,000*	3	1½ S. A.	Feb., 1909
Cambria Iron	45¼	— ¼			8,468,000*	4	2 S. A.	Sept., 1908
Chicago Pneumatic Tool	.....	.....	Feb.	15	6,145,800	4	1 Q.	Oct., 1907
Colorado Fuel	44½	— ⅛	Oct.	18	34,235,500		3½	April, 1902
Crucible Steel	11¾	+ ⅜	Oct.	20	24,578,400		.....	.....
Crucible Steel, pr	74⅞	+⅞			24,436,500	7 cum	1 Q.	Mar., 1909
Empire Steel	10	+5	April	27	1,254,770		.....	.....
Empire Steel, pr	60	.....			2,500,000	6 cum	3 S. A.	July, 1909
Fay & Egan	90	.....	Feb.	18	1,000,000	7	1¾ Q.	Nov., 1908
Fay & Egan,pr	125	.....			1,000,000	7 cum	1½ Q.	May, 1909
General Electric	167	+1½	May	11	65,178,800	8	2 Q.	July, 1909
Harbison-Walker	20½	+ ¼	Jan.	18	18,000,000		½	Oct., 1907
Harbison-Walker, pr	87	.....			9,600,000	6 cum	1½ Q.	April, 1909
International Pump	40	+ ⅛	June	8	17,762,500		1	April, 1905
International Pump, pr	88	— ¼			11,350,000	6 cum	1½ Q.	May, 1909
Lackawanna Steel	48	.....	March	10	34,971,400		.....	.....
Lake Sup. Corp	24¼	— ¼	Oct.	6	40,000,000		.....	.....
New York Air Brake	89	+3	June	17	8,012,500	8	2 Q.	Oct., 1907
Niles-Bement-Pond	100	.....	Feb.	3	8,500,000	3	1½ Q.	June, 1909
Niles-Bement-Pond, pr	100	.....			2,000,000	6 cum	1½ Q.	May, 1909
Otis Elevator Co	59	+3	March	15	6,375,300		1½ S. A.	April, 1909
Otis Elevator Co., pr	99	.....			6,295,000	3 n. c.	1½ Q.	July, 1909
Penn Steel	68	.....	May	10	10,750,000		.....	.....
Penn. Steel, pr	116½	+ ½			16,500,000	7 n. c.	3½ S. A.	May, 1909
Pittsburg Coal Co	13¼	+2¼	March	9	28,104,600		.....	Nov., 1906
Pittsburg Coal Co., pr	51⅜	+1⅜			27,071,800	7 c.	1¾	April, 1905
Pressed Steel Car	46⅜	+2¾	Feb.	17	12,500,000		3	Aug., 1904
Pressed Steel Car, pr	106	— ½			12,500,000	7 n. c.	1¾ Q.	May, 1909
Pullman	190	.....	Nov.	10	100,000,000	8	2 Q.	May, 1909
Railway Stl. Spring	46½	.....	March	4	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	106	+1			13,500,000	7 cum	1¾ Q.	July, 1909
Rep. Iron & Steel	33¾	+ ¾	Oct.	20	27,191,000		.....	.....
Rep. Iron & Steel, pr	109	+1¾			20,416,900	7 cum	1¾ Q.	July, 1909
Sloss-Sheffield	83	—1	March	10	10,000,000	5	1¼ Q.	June, 1909
Sloss-Sheffield, pr	116½	.....			6,700,000	7 n. c.	1¾ Q.	July, 1909
U. S. Pipe & Fdy	31¼	+1¼	June	23	12,500,000	2	½ Q.	Dec., 1907
U. S. Pipe & Fdy, pr	83½	+1½			12,500,000	7 n. c.	1¾ Q.	Sept., 1908
U. S. Steel	71⅛	—1	April	19	508,302,500	2 n. c.	½ Q.	June, 1909
U. S. Steel, pr	127	— ¼			360,281,100	7 cum	1¾ Q.	June, 1909
U. S. Steel, 5s	106	.....			463,798,000	5	5 A.	.....
Va. Iron, Coal & Coke	66¾	+ ¾	Sept.	21	9,073,680		.....	.....
Westinghouse Elec	84¾	.....	June	16	27,173,200	10	2½ Q.	April, 1909
Westinghouse Air Brake	116½	+2½	Oct.	5	14,000,000*		2½ Q.	Oct., 1907

Par value of shares, $100, except those starred (*), $50.

Copper Stocks.

New York.—Amalgamated Copper closed 84, a net gain of 2⅛.

Boston.—Butte Coalition closed at 26⅛, a net gain of 1¾; Calumet & Arizona closed 105¾, a gain of 2¾; Calumet & Hecla closed 650, an advance of 25; Quincy Mining closed 90, a net gain of 1; North Butte Mining closed at 57½, a gain of 6.

Financial Notes.

The Republic Iron & Steel Co. has declared a dividend of 6¼ per cent, to cover a back dividend of 7 per cent cumulative stock. Payments will be made as follows: Oct. 1, 1909, ¾ of 1 per cent, and 1 per cent on each of the years from 1910 to 1915.

Cambria Steel Co. has declared a dividend of 1½ per cent, payable Aug. 12, to holders of record July 18.

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

January	5,506
February	5,346
March	5,396
April	5,508
May	5,533
June	5,551

July 29, 1909.

RAILROAD CONSUMPTION OF STEEL.

The appearance of Poor's annual railroad statistics furnishes means for a resume of railroad building and of railroad business during a portion of the depression.

The total length of steam railroads in the United States, Dec. 31, 1908, was 232,046 miles. The net increase in the past six decennial periods is shown below. Twenty-three miles of road were in operation in 1830, the year in which the statistics start.

INCREASE IN STEAM RAILROAD MILEAGE.

1830-1848	5,996
1849-58	20,972
1859-68	15,261
1869-78	39,518
1879-88	74,367
1889-98	30,696
1899-1908	45,236
Total	232,046

It chances that the grouping into decennial periods ending with last year makes the recent divisions fall at seasonable periods. Thus in 1898 the increase was only 2,219 miles, while for several preceding years it was less than 2,000 miles, but in 1889 the increase was 4,008 miles, and about that rate was kept up in succeeding years. Again, the three years 1886-7-8 averaged over 9,000 miles a year, while the next three years averaged less than 5,000 miles. Thus it is that the last four decennial periods have shown alternate maxima and minima in new railroad building, the decade ending with 1878 showing less than 40,000 miles of new road, the next decade nearly 75,000 miles, the next 30,000 miles and the next 45,000 miles.

Twenty years ago, there was only one mile of second track, siding, etc., for 4.4 miles of main line. In the fiscal year 1908, there was one mile of subsidiary track for every 2.2 miles of main line, showing a doubling in the proportion of subsidiary track in 20 years.

As the statistics give the average mileage of track during the railroads' fiscal year, the average for the fiscal year 1908 is substantially identical with the track mileage Dec. 31, 1907. In the 10 years ending that date, the increase in total track was 101,730 miles. It is somewhat difficult to estimate the average weight of rails laid, but 80 pounds will probably not be wide of the market. On that basis the increase in track involved about 12,800,000 tons. The production of standard steel rails in the 10 years was 26,572,465 tons, deducting exports from which leaves 23,900,000 tons, so that between 50 and 55 per cent of the production of standard rails for domestic use went into new track.

Another large part of the output went for the replacement of old and light rails by heavier rails. The railroads have really been in process of rebuilding, the improvements being partly invited by the ease with which funds could be secured, and partly necessitated by the demand for strengthening due to heavier rolling stock and greater speeds.

Illustrative of the fact that much mileage has been brought up to the modern standard lately, and that some still remains to be brought up, it may be cited that at the close of 1897 there were 24,435 miles of track still laid with iron rails, while at the close of 1907 there remained 8,970 miles of track in iron rails. The decrease in the 10 years was 15,465 miles, and laying that mileage in 80-pound steel rails would account for nearly 2,000,000 tons of rails.

Making some allowance for the replacement of light steel rails with heavy steel rails, it is evident that to replace rails which were of proper weight, but had merely worn out, less than a million tons a year have been required in the past 10 years. The annual requirements in the next few years promise to be greater, as the service is heavier, but as more and more rails of special quality come to be used, the rails will give a better account of themselves.

The equipment has increased much more rapidly than the mileage. In the last fiscal year, there were 265 locomotives per 1,000 miles of road, with 966 revenue cars. Twenty years earlier, there were only 193 locomotives and 625 revenue cars per 1,000 miles of road. The numbers, of course, tell but a small part of the story. Locomotives have increased greatly in weight, and so have cars, while the all-steel car is practically the creation of the past 10 years. While it remains that the greatest employment of steel is in rails, yet the steel involved in cars, locomotives, bridges, buildings, etc., has become an important item. Possibly the railroads have in use half as much iron and steel in these other forms as they have in rails, and the proportion is naturally increasing steadily. The maximum density of traffic has been reached upon an almost infinitesimally small proportion of the total railroad mileage. This is obvious when it is considered that much more than half the total mileage is still single track, while of the double track only a relatively small part is equipped with signaling arrangements permitting trains to be run close together.

The statistics of traffic do not show the decrease which might be surmised considering the reports of so many

idle cars during the depression. The statistics cover the fiscal year 1908, which is chiefly the year ended June 30, 1908, involving eight months of the depression. The total freight movement in the fiscal year was 215,698,911,350 ton miles, a decrease of considerably less than 10 per cent from the previous fiscal year, and coming within a fraction of a per cent of equaling the fiscal year 1906. The movement well exceeded that of any previous year, and was almost double the movement 10 years earlier. On account of the increase in mileage, the total is not so favorable, compared with the equipment, but the freight movement per mile of road falls short only of 1906 and 1907, slightly exceeding that of 1905.

The passenger movement makes a more favorable showing than the freight movement, as the number of passenger miles in the fiscal year 1908, 28,985,670,148, is the greatest on record, and the number of passengers per mile of road is also the greatest on record.

The average receipts per ton of freight carried one mile was 0.927 cent in 1890. There was a fairly steady decline to 0.726 cent in 1899, then an increase to 0.793 cent in 1904, since when there has been a very slight and irregular decline to 0.765 cent in 1908. The claim is sometimes made on behalf of the railroads that a great decrease has occurred in freight rates, but the statistics only bear out the claim when reference is made to times very far back.

Passenger receipts have varied but slightly. The maximum in 19 years was 2.184 cents per passenger per mile, in 1891. In only two years in the period did the average drop below 2 cents, in 1898, with 1.994 cents, and in 1908, with 1.950 cents.

The real burden of the railroads is that on account of competition and for advertising purposes they maintain a higher standard of passenger service than the receipts warrant. The burden has become heavier in late years on account of the increased cost of operation. With freight there has been the opportunity to increase train loads and introduce an economy which has more than compensated for the increased cost of operation and has left room for a slight reduction in rates. In passenger traffic there has not been the same compensation.

In 1890 the average number of passengers per train was 42.12; this decreased to 36.49 in 1897, and increased to 56.75 in 1908. The increase was slight, and there is obviously not much money to be made carrying an average of only 50 or 60 passengers in a train. In the freight service, on the other hand, there has been an enormous increase in the train load. In 1890 the average freight train load was 163.99 tons, the average for the three years 1890-1-2 being about 163 tons. Every year since has shown an appreciable increase, until 1908 showed an average load of 366.01 tons, so that in say 17 years the load was multiplied by two and a quarter. The expense of moving a train did not increase in proportion, and even with the reduced rates the freight business at present is evidently more profitable, compared with the passenger business, than it was 15 or 20 years ago. That passenger business is not more profitable is due chiefly to competition in character of service.

NEW STEEL CAR WORKS.

The Joliet Steel Car Construction Co., Joliet, Ill., has been organized with a capital of $2,000,000 to engage in the manufacture of steel cars. Robert B. Campbell, who for a number of years has been general manager of the Elgin, Joliet & Eastern Railroad Co., has been elected president; Victor R. Browning, of the Browning Engineering Co., Cleveland, first vice president; John F. Skeel, secretary; John B. Mecham, treasurer, and William Q. Olden, Chicago, has been appointed chief engineer. The directors of the company are Henry Leach, Fred Benitt, C. E. Antrim, C. E. Robinson, Dr. H. W. Woodruff and Harry W. Davis, Wilmington, Del., who has been appointed eastern representative. An option on a site of 60 acres has been secured near Joliet, and it is expected that ground will be broken for the new plant in the near future.

Creditors of the Embree Iron Co., Greenville, Tenn., have filed a petition in the federal court at Greenville to have the concern declared bankrupt.

PROFIT-SHARING PLAN

Inaugurated by the International Harvester Co.

The International Harvester Co., Chicago, has inaugurated a profit-sharing plan which involves the purchase of both common and preferred stock by its employes. The preferred stock is entitled to dividends at the rate of 7 per cent per annum before any dividend is paid on the common. The preferred stock is offered at $115 per share and the common at $75 per share. Each officer and employe may subscribe for an amount not exceeding his annual wages or salary. An aggregate amount of 12,500 shares of preferred and 15,000 shares of common is available for subscription, and in case the total subscription exceeds the amount for allotment, then the subscriptions received will be scaled by the finance committee. Payment shall be made in monthly installments to be deducted from the subscriber's salary or wages in such amounts as he may desire, provided that the minimum monthly installment shall be $1.50 per share for preferred and $1.00 per share for common, and no installment shall exceed 25 per cent of a month's salary or wages. The subscriber may have not exceeding five years in which to pay his subscriptions, and 5 per cent interest will be charged on deferred payments. From the date on which payments begin and during the continuation of such payments, dividends on the stock will be credited to the account of the subscriber as part of his payment until his subscription is fully paid and the stock issued to him. Thereafter the dividends will be paid in the same manner as to the other stockholders.

Special Allowance.

As a further inducement to each subscriber to make his payments regularly until the amount subscribed is fully paid, to retain his stock thereafter and to remain continuously in the employ of the company, the following offer is made:

A special allowance of $4 per share on subscriptions for preferred stock and $3 per share on common stock will be credited to each subscriber whose subscription is still in force but not yet fully paid, in August of each year, for five successive years commencing with August, 1910. This will be paid in cash to each subscriber who has received the stock and still retains it and exhibits each year his certificate to the treasurer of the company. If the subscriber shall remain continuously

in the service of the company, or any of its affiliated concerns, from the date of his subscription, the company contemplates that, at the end of five years, he may receive a still further allowance, which cannot now be ascertained, but which will be derived as follows:

Any subscriber who discontinues payments at any time before his subscription is fully paid, will not receive the $4 or $3 per share, and this will be paid annually into a special fund. This will be credited with 5 per cent annual interest, and at the end of the five-year period the total amount thus accumulated will be divided into as many parts as shall be equal to the number of shares of preferred stock, plus two-thirds of the number of shares of common stock then remaining in the hands of the subscribers who shall have continued in the employ of the company for the five-year period.

If a subscriber shall leave the service of the International Harvester Co., or cancel his subscription before it has been fully paid, or discontinue his regular monthly payments without the consent of the company for a period of three months, his account will be closed and the amount which he has paid, with interest at 5 per cent, will be returned to him. However, if the head of the department in which the subscriber is employed certifies that he has left his employment without fault on his part, or that the cancellation of the subscription or discontinuance of monthly payments was due to causes beyond his control, and if the head of the department recommends that the subscriber be given such an amount of stock in even shares as the sum of his payments theretofore made and 5 per cent interest thereon will pay for at the original purchase price with interest at 5 per cent (less any dividends collected on any such shares), then the subscriber, at his option, may receive such number of shares, together with the balance, if any, in cash; or he may receive the amount of such payments and interest all in cash, if desired.

Permanent Disability or Death.

If during the five-year period, a subscriber becomes permanently disabled or dies while faithfully serving the company, it will, at the option of the subscriber, or (in case of his death) of his estate, turn over to him, or his estate, either the money paid on account of the stock he was purchasing, and 5 per cent interest, together with a sum equal to $4 or $3 per share for preferred or common stock for each of the five years that expired, or it will deliver such an amount of stock in even shares, as the total sum will pay for at the original purchase price, with interest thereon at 5 per cent per annum, less any dividends collected on such shares.

Subscribers whose employment may be suspended by reason of the temporary closing of the plant, and who shall continue ready and willing, when required, to resume their services, will not be deprived of the annual bonus of $4 or $3 per share, as the case may be, during such suspension, nor will this interfere with their accepting employment elsewhere during the suspension of a plant. As presumptive evidence of their willingness to resume their employment, the company will accept from the holders of fully paid subscriptions the presentation to the treasurer, in August of each year, of the original stock, and from the holders of partly paid subscriptions the retention by them of their subscription during the preceding year and full payments thereon up to date of such suspension. This period of suspension will not be counted as part of the five years' limit for the full payment of the subscriptions, and during such suspension monthly payments will not be required, though they may be continued if so desired by the employe. In case of death of any subscriber during such suspension, his estate or the person designated by him will be entitled to the same benefits accruing to his subscription as if he had died while employed. Subscriptions will be received until Aug. 15, and allotments will be made a few days later. The first deductions from the payment of stock will be made from the August salary of wages.

PIG IRON STATISTICS.

Production During the First Half of 1909—Furnaces Under Construction and Rebuilding.

Statistics compiled by the American Iron and Steel Association of the production of pig iron in the United States in the first half of 1909, show a total output of 11,022,346 gross tons, against 9,018,014 tons in the last half of 1908 and 6,918,004 tons in the first half of 1908. The production of pig iron in the first half of 1909 was a little over 81.7 per cent of the production in the first half of 1907, when 13,478,044 tons were made, during which latter period the iron trade was not affected by panic conditions. The following table gives the half-yearly production of pig iron since 1906:

Gross tons.	1906.	1907.	1908.	1909.
First half	12,582,250	13,478,044	6,918,004	11,022,346
Second half	12,724,941	12,303,317	9,018,014	.....
Total	25,307,191	25,781,361	15,936,018	.....

The increase in production in the first half of 1909, as compared with the second half of 1908, amounted to 2,004,332 tons, and as compared with the first half of 1908 to 4,104,342 tons. Production in the first half of 1909 was 2,455,698 tons less than in the first half of 1907 and 1,280,971 tons less than in the second half of that year.

Classified Production.

The production of Bessemer and low-phosphorus pig iron in the first half of 1909 was 4,481,490 tons, against 3,828,485 tons in the last half of 1908, and 3,388,491 tons in the first half. The production in the first half of 1909 includes 109,866 tons of low-phosphorus pig iron, against 68,791 tons in the last half of 1908 and 61,825 tons in the first half of that year.

The production of basic pig iron in the first half of 1909 was 3,288,573 tons, against 2,528,532 tons in the last half of 1908 and 1,481,612 tons in the first half. The production in the first half of 1909 was the largest in any half year in our history and was larger than any whole year prior to 1905, when 4,105,179 tons were made. Basic pig iron made with charcoal is not included in any of the above figures.

The production of charcoal pig iron in the first half of 1909 was 171,389 tons, against 119,926 tons in the last half of 1908 and 129,220 tons in the first half. These figures include a few tons made with charcoal and electricity.

The production of spiegeleisen and ferro-manganese in the first half of 1909 was 80,785 tons, against 66,525 tons in the last half of 1908 and 85,493 tons in the first half. The production of spiegeleisen alone in the first half of 1909 was 40,107 tons, and of ferro-manganese alone the production was 40,678. tons.

Production by Fuels.

The production of bituminous coal and coke pig iron in the first six months of 1909 amounted to 10,582,455 tons, as compared with 8,753,493 tons in the last half of 1908; the production of anthracite and coke mixed, in the first half of 1909, was 260,245 tons, as compared with 144,595 tons in the last half of 1908; of anthracite alone the production was 8,257 tons, as compared with nothing in the last half of 1908; charcoal production is given above.

Furnaces in Blast.

The whole number of furnaces in blast on June 30, 1909, was 258, against

236 on December 31, 1908, and 168 on June 30, 1908. The number of furnaces idle, including furnaces being rebuilt, on June 30, 1909, was 205, against 223 on Dec. 31, 1908, and 283 on June 30, 1908.

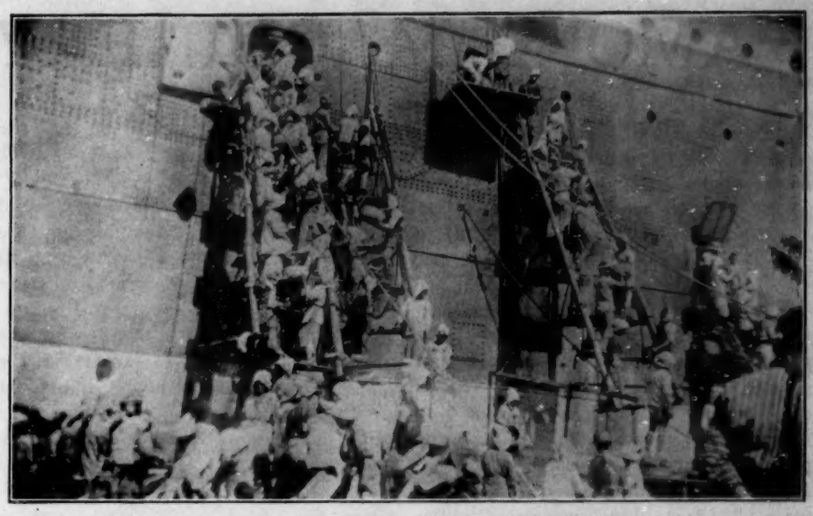
During the first six months of 1909 the number of furnaces actually in blast during a part or the whole of the period was 315, as compared with 279 in the last half of 1908, and 250 in the first half of that year.

Building Furnaces.

On June 30, 1909, there were 15 furnaces in course of construction, of which 14 will use mineral fuel and one will use charcoal, as follows: New York, one; Pennsylvania, five; Ohio, two; Indiana, four; Illinois, one; and Michigan, two. In addition one furnace in Virginia was partly erected but work on its construction has been indefinitely suspended.

Rebuilding Furnaces.

On June 30, 1909, there were 14 furnaces being rebuilt, 13 mineral fuel and one charcoal, as follows: New Jersey, one; Pennsylvania, seven; Alabama, two; Ohio, two; and Illinois, two.



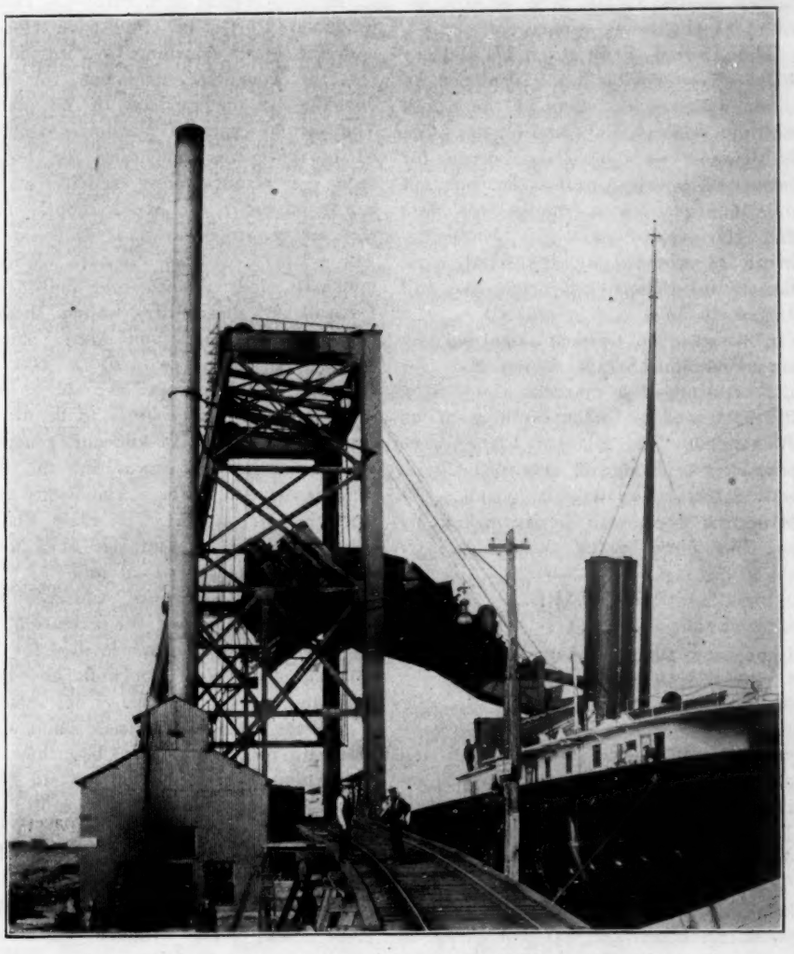
PRIMITIVE METHOD OF COALING SHIPS IN JAPAN.

PRIMITIVE JAPANESE COALING OPERATIONS.

The accompanying illustrations, depicting oriental and occidental methods of coaling steamships, cannot fail to interest readers of THE IRON TRADE REVIEW, not only because of the marked contrast so clearly shown, bnt also because of the novelty of one of the photographs. This photograph shows the method of coaling the steamship Mongolia, of the Pacific Steamship Co., at Nagasaki, Japan, and is extremely novel because of the marked hostility shown by the Japanese toward foreigners in the use of cameras in the "Flowery Kingdom." It was taken by an Ohio woman, who also furnished the facts relating thereto. The other photograph shows, in operation, a modern coal-handling plant, manufactured by the McMyler Mfg. Co., Cleveland.

The primitive method of coaling is carried on by the Japanese, as follows: The coal is carried out to the vessel in "junks," or small flat boats which moor alongside the ship to be coaled. The fuel is then passed by hand from the "junks," in baskets holding from 15 to 20 pounds, up ladders, and into the stokehold of the ship, men, women and children being employed to do the work at the rate of about 7½ cents each per day. They are allowed to descend from the ladders in relays of about 15 or 20, six or seven times a day for rice and tea.

The Mongolia is a vessel of 27,000 gross tons, one of the largest on the Pacific, plying between San Francisco and the Orient. Coaling began at daylight, and continued about 9 hours and was done by 500 coolies, at a cost of about $40, 4,000 tons of coal being taken on.



SHIP RECEIVING COAL FROM A MODERN COAL-HANDLING PLANT.

Alfred Reeves, general manager of the American Motor Car Manufacturers' Association, estimates that the 1910 production will amount to 200,000 cars. Mr. Reeves states that the figures may not be reached, because it might not be possible for the builders to accomplish the feat, but he claims a sure increase of 15 per cent.

AMONG MACHINERY MAKERS.

NEW YORK.

Large Order for Cranes to be Placed by the Delaware, Lackawanna & Western.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., July 27.

The machine tool trade in the east continues to reflect the general improvement in business conditions and is now in receipt of a steady stream of inquiries which is keeping selling interests comfortably busy. The large purchase by the American Locomotive Co., noted a week ago, has had a material effect in encouraging smaller buyers who have been unwilling to cover their requirements until some such action developed on the part of an important concern. There is now reason to believe that an early decision will be reached on some large lists which have been before the trade for some time. Most prominent among these is that of the Delaware, Lackawanna & Western, which with the additional crane inquiry recently circulated involves the expenditure of about $200,000, all the equipment being for the new Scranton shops. It is stated that a decision has been reached on the 10 or 12 cranes required, though no definite announcement has been made, and all will be furnished by one manufacturer. Awards on the machine tool list are expected during the current week or next. There is no particular hurry for deliveries, the time for the majority of the tools being about the first of the year. The trade is also considering a scattering of inquiries from car building interests, the first important movement of this kind to develop since the depression set in.

Local houses report considerable business from the south and southwest. The demand from automobile manufacturers holds up remarkably well and heavy orders continue to come from the Detroit district. The list of tools recently circulated by the Fiat Automobile Co., which is to build a plant at Poughkeepsie, N. Y., is regarded as merely preliminary and is not expected to result in early business, although eventually a large list of equipment will be purchased.

Equipment for the foundry under construction for the T. H. Symington Co., at Seneca, N. Y., has largely been placed, this being in charge of George K. Hooper, consulting engineer at 165 Broadway, New York. Practically all the crane and hoisting requirements will be filled by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

Builders of cars, steam shovels and general contractors' equipment are now devoting considerable attention to the Ashkokan water supply district and the barge canal operations in upper New York, as a number of the contractors are in the market for the lines indicated and some important orders are being closed. There is a good demand for steel rope from both these districts.

The local office of the Mesta Machine Co., 50 Church street, reports considerable activity on the part of brass and copper mills in the Connecticut district and has made a number of recent sales of rolls. Orders have also been booked for hollow cored rolls for the rubber trade and for paper rolls. M. P. Fillingham, who has had a long connection with the American Brass Co. and other copper and brass rolling interests, is now in charge of this office, having succeeded Rodman Day, who is now located at the home office.

The United Fruit Co., 17 Battery Place, New York City, has placed an order with the receivers of the South Baltimore Steel Car & Foundry Co., Baltimore, for 60 box cars for export to South America and has put out inquiries for a number of flats and refrigerator cars. A brisk demand is noted for industrial cars, largely for export, but prices are still extremely low.

Contracts have been awarded by the Emerson Steam Pump Co. for the erection of a machine shop, 60 x 250 feet, and an office building at its Alexandria, Va., plant. Plans were prepared by Dodge & Day, 608 Chestnut street, Philadelphia, and the structural steel will be furnished by the Baltimore Bridge Co.

PITTSBURG.

Important Plant Construction Under Consideration—Tin Mills Let.

Office of THE IRON TRADE REVIEW, 510 Park Building, July 27.

Important projects in iron, steel and allied lines of manufacture, which involve considerable new plant construction, continue to arise as industrial conditions are improving, and are lending better prospects to the machinery market. Some large undertakings, of which public announcement has not yet been made, are now undergoing development. With the important construction program of the Jones & Laughlin Steel Co., at Aliquippa, Pa., the Republic Iron & Steel Co., and the Youngstown Sheet & Tube Co., at Youngstown, which have been greatly advanced through recent contract awards and with other important enterprises in sight, machinery makers and dealers are becoming more optimistic as to conditions of trade. Two important contracts have just been closed by independent interests for doubling sheet and tin plate capacities. The machine tool situation in this district has not shown any marked gain in the volume of orders placed, but the outlook is much more promising. There has been some buying of single tools by heavy machinery and valve shops but no large orders have been placed. The United States Steel Corporation has been sending out some inquiries for machine tools for its Lorain, O., plant. The specialty foundries are operating favorably, but some of the jobbing shops have not been so fortunate in booking orders.

The McKeesport Tin Plate Co., with works at Port Vue, Pa., have closed with the Mesta Machine Co., Pittsburg, for the complete equipment for the doubling of the capacity of its plant. The various types of machinery included in this order emphasize the broad range of manufacturing activity which is carried on in the Mesta shops. The contract awarded by the McKeesport Tin Plate Co. calls for ten 26-inch hot mills, four 22-inch cold mills, one vertical bar shear, 10 doubling shears, five squaring shears, one Mesta patent pickling machine, two 30 x 60-inch simple Corliss engines, two 20 x 36-inch simple Corliss engines to be direct connected to two 250-kilowatt generators and two rope drives for the hot mill department. These extensions will give the McKeesport Tin Plate Co. a plant double its present size or a total hot mill equipment of 20 mills.

The Inland Steel Co., Chicago, has awarded contracts for the extension of its sheet capacity which provides for the installation of eight hot mills and two cold mills. The company has placed a contract with the Mesta Machine Co., Pittsburg, for a 34 and 60 x 60-inch heavy duty compound Corliss engine and gear drive for operating the new mills. A contract has also been placed with the Mesta Machine Co. for an air compressor, by the Pressed Steel Car Co., for immediate delivery to its plant at McKees Rocks. The cylinder dimensions will be 22 and 36 inches steam, and 20

and 34 inches air, and the stroke, 40 inches.

The Jones & Laughlin Steel Co. is about to place an order for a large, heavy-duty, cross-compound, vertical Corliss engine, which is to be installed in its South Side works, Pittsburg, for driving the new Morgan continuous billet mill that has recently been contracted for.

Mackintosh, Hemphill & Co., Pittsburg, are making shipments to the Jones & Laughlin Steel Co. for its new plant at Aliquippa, Pa., of a twin-tandem, compound condensing, direct-connected reversing engine which is the second of its type, and probably the largest and heaviest to be built for heavy duty work in steel mills. The cylinder dimensions are 44 and 70 inches and the stroke 60 inches. At 100 revolutions per minute, the engine will develop 20,000 horsepower. The first engine of this type to be built by the Mackintosh, Hemphill Co. is now in successful operation at the Duquesne works of the Carnegie Steel Co., having been installed there within the past year. At Aliquippa, this equipment will be one of the principal power units of the new works.

Construction work upon several new coal and coke plants at properties recently acquired, is being advanced by two important interests in this territory. The Jamison Coal & Coke Co., Pittsburg, has contracted for two large shafts to be sunk upon a tract of 6,850 acres located just west of Fairmont, W. Va., which was recently purchased. The awards for the machinery will shortly be made. The Isabella-Connellsville Coke Co., through its engineers, Geo. S. Baton & Co., Keystone building, Pittsburg, has also closed a contract for two concrete-lined shafts for its No. 1 plant in Luzerne township, Fayette county, Pa. This company is planning the erection of a large coke plant.

The Roessler & Hasslacher Chemical Co., 100 William street, New York, has installed in its works at Perth Amboy, N. J., a 300-horsepower Westinghouse horizontal gas engine operating on producer gas derived from anthracite coal. The generator furnishes three-phase, 60-cycle, alternating current at 480 volts to be used for power and lighting services about the plant.

The Wm. Tod Co., Youngstown, has received an order for a low pressure, 96-inch, long cross-head blowing engine for the Struthers Furnace Co., the order calling for shipment within 30 days. This short delivery is possible through the fact that during the dull times the Wm. Tod Co., in order to keep its plant going, built several of its standard blowing engines for stock so that the Struthers engine can be shipped immediately.

MILWAUKEE.

Numerous Orders for Municipal Work—Steel Founders Busy.

Milwaukee, July 27.—The gratifying condition of business among the larger concerns in Milwaukee and suburbs is being reflected in all parts of the state of Wisconsin, and there is no discordant note in the reports coming in from either machinery or structural steel manufacturers. The improvement is especially noticeable in the bridge and building lines. In public works, conditions are better than for a year or more, as municipal boards, who were forced by popular clamor 18 months or so ago to practically stop expending public funds for improvements, are now beset by the shouts of taxpayers to "do things." The contracts that are being awarded at this time are not large, but they are keeping the smaller plants working at full capacity.

J. George Shaw, president of the Milwaukee Steel Foundry Co., South Water and Virginia streets, says that the plant is running at capacity and that it is overloaded with orders. "We are employing every man who is competent. Orders are coming thick and fast and business is far above normal. We would like to see our way clear to handle the volume of business. As far as I can see, conditions generally in Milwaukee are most gratifying."

The Kearney & Trecker Co., Milwaukee, has commenced work on the new power house at the West Allis plant and will occupy it about Aug. 25. The building will be of brick, 48 x 60 feet in dimensions. A 200-horsepower steam engine will be installed.

J. R. S. Blaine, designer for the Berlin Machine Works, Beloit, Wis., has sailed for Europe. He will superintend the erection of sawmill machinery at Berlin, Germany, which was shipped from Beloit some time ago. Incidentally he will spend about two months in traveling on the continent and also will inspect Berlin machinery in various cities in Europe.

The city of Milwaukee has awarded the contract for furnishing 2,350 tons of 30-inch cast iron water pipe to the United States Cast Iron Pipe & Foundry Co., at $24.40 per ton. The contract amounts to $57,340.

The Reliance Iron & Engine Co., Racine, Wis., is making numerous improvements, including an addition to the foundry on West street.

O. R. Gardner, general superintendent of the Racine-Sattley Co., Racine, Wis., has started for the west for an extensive business trip and to study trade conditions. He will be absent at least six months.

The Chain Belt Co. has been granted a permit to build a $3,000 warehouse at 736 Park avenue, Milwaukee. The works are at West Allis.

The Fairbanks-Morse Co., Beloit, Wis., has just shipped five rotary pumps for private fire apparatus, to the Northern Pacific Railroad Co.'s headquarters.

At the annual meeting of the Janesville (Wis.) Machine Co., the following officers were elected: President, T. O. Howe, to succeed the late Levi B. Carle; vice president, James Harris; secretary, Allan P. Lovejoy Jr.; treasurer, John G. Rexford. H. S. Lovejoy was elected director to succeed the late Hiram Merrill, and N. L. Carle fills the vacancy caused by his father's death.

The Freeland Steel Tank Co., Portage, Wis., recently opened, is distinct from the B. F. Freeland & Sons Co., of Sturgis, Mich. Curtis Freeland purchased the interest of Lloyd Freeland in the latter concern and will continue at Sturgis, Mich. The Sturgis Machine Co. will manufacture his product. The Freeland Co., of Portage, is owned by Lloyd Freeland and Frank Van Epps, who will manufacture their own product at Portage.

The Stevens Point Autogenous Welding Co. has been formed at Stevens Point, Wis., by A. A. Sustins, who has obtained Wisconsin rights to use the welding process.

Plans are being made by Allis-Chalmers Co., Milwaukee, for the proposed 370-foot addition to the blacksmith department. This was to have been built a year ago but business conditions made it desirable to defer its construction.

The board of regents of the University of Wisconsin, has awarded contracts for a $25,000 addition to the college engineering building.

A charter has been granted to the Antigo Electric Co., Antigo, Wis.; capital stock, $125,000. The incorporators are John Mauser, Charles M. Cleavland and F. A. Becker.

S. W. Lamoreaux, president of the Beaver Dam (Wis.) Malleable Iron Co. and allied companies, is seriously ill as the result of an accident while on a fishing trip. He cut his hand with fish line and the wound became infected.

Lindsay Bros., Milwaukee, manufacturers' dealers in farm machinery and implements, sustained a loss of $100,-

000 on July 21, when their Minneapolis plant and warehouses were totally destroyed by fire. T. B. Lindsay, formerly of Milwaukee, is manager of the plant.

CINCINNATI.

Heavy Demand for Machine Tools for Prompt Shipment.

Office of THE IRON TRADE REVIEW, First National Bank Bldg., July 27.

Reports continue almost universally favorable and the permanency of the improvement in the demand for machine tools is practically established. All of the shops are preparing for increased business and there is a steady demand for men, as working forces are being increased. Correspondence still indicates that a number of purchases are being deferred until fall. Two of the local plants have made arrangements to move into larger quarters with increased facilities and some of the shops are purchasing additional equipment. It is interesting to note the demand for quick deliveries, and agents have difficulty in interesting a customer for almost any type of machine when it is found that the shop cannot make prompt delivery.

The John B. Morris Foundry Co. has been steadily adding to its equipment and is installing in its foundry a Sly cinder mill to crush cupola cinders, also 10 tumbling mills; furnished by the same concern provided with an exhaust system. The entire equipment involves an expenditure of about $5,000.

The Willard Machine Tool Co., now located at 118 and 122 West Second street, manufacturer of power presses, dies and special machinery, has secured property at the corner of Third and Madison streets, in Covington and will put up a one-story building, 90 x 100 feet, at once. The corner location will give excellent light and the building will be so constructed so to admit of illumination from above as well as the sides. The company expects to move into its new quarters this fall and will add to its line a 13-inch lathe.

The Standard Pulley Co. has received this week orders for a total of 2,500 pulleys, of which 1,500 will go to one concern, making automobile specialties near Indianapolis. While a number of these pulleys are small the order is unusually large and the company reports the outlook for further business as excellent.

TORONTO.

New Canadian Enterprises—Strike Against Standard Time.

Toronto, July 26.—The National Iron Works, Ltd., of which Cawthra Mulock, of Toronto, is president, has secured from the city a site comprising about 22 acres in Ashbridge's marsh, of which about five acres is land and the remainder under water. The price to be paid is $35,000, the company agreeing to expend $100,000 in buildings within one year and to fill in the portion now covered with water within five years.

A petition has been filed here for the winding up of the Farmers Co-operative Harvesting Machine Co., Ltd., of Toronto, the factory of which is located at Whitby, Ont. It was established in 1903 for the manufacture of agricultural implements with a nominal capital of $1,000,000, of which $174,000 is said to have been subscribed and about $140,000 paid up. The petitioner is Aaron B. Haines.

The Waterloo Mfg. Co., Ltd., Waterloo, Ont., shipped last week a trainload of 21 cars of threshing machinery, valued at $100,000, to its western headquarters at Portage la Prairie, Man.

The American Weather Strip & Hardware Mfg. Co., Grand Rapids, Mich., is establishing a branch in Hamilton, Ont., and is now installing its plant in the building formerly occupied by the Wentworth Carriage Co. A. E. Gould will manage the weather-strip branch, and F. S. Frost comes from Grand Rapids to take charge of the hardware department.

The laying of steel rails on the Grand Trunk Pacific railway between Winnipeg and Edmonton was completed July 15. The ballasting of the track will be proceeded with as rapidly as possible, and it is hoped that a regular service can be put on early in the fall. The contract for the section of the road between the Macleod river and Tebe Jaune Cache, B. C., 180 miles long, has been awarded to Foley, Welch & Stewart. This section will carry the line through Yellowhead pass and 50 miles further west.

The blacksmiths and boilermakers employed at the Montreal Locomotive & Machine Works, Longue Pointe, went on strike last week. They object to the "standard time" system which the company is attempting to enforce, asserting that it meant a cut of 33 per cent in wages. The management deny that the system would involve any reduction in pay.

Kilmer, Pullen & Burnham, Ltd., has been incorporated with an authorized capital of $40,000, to manufacture electrical machinery at Toronto. Frank Pullen, Geo. C. Burnham and George H. Kilmer are provisional directors.

Robert E. Clisdell, Fred V. Clisdell, Anna E. Clisdell and others have been incorporated as the Advance Power Co., Ltd., with $200,000 capital, to manufacture gasoline engines and do a foundry and machine business at Toronto.

WILL USE WATER POWER.

Cleveland-Cliffs Co. Plans to Dam the Carp River.

Republic, Mich., July 26.—With the purpose of supplying electric power for the operation of all of its many mines on the Marquette range, the Cleveland-Cliffs Iron Co. will proceed shortly with the work of harnessing the Carp river at a point east of Eagle Mills. The project is a most ambitious one and will entail a heavy expenditure of money. A large force of men will be employed and the operations will be prosecuted steadily until completed, notwithstanding which it is hardly likely the new plant will go into commission prior to January, 1911. High power transmission lines will convey the electric current to the mines at Negaunee and Ishpeming and to the properties in the Swanzey district, some 20 miles south of Negaunee.

Although there are many potential water powers in the Marquette iron region, it is a rather remarkable fact that only one has yet been developed, that which serves the Marquette municipal lighting plant. In the adjacent county of Dickinson, a hydraulic plant on the Menominee river has long furnished power for the operation of the big Chapin mine of the United States Steel Corporation; the Sturgeon falls have been developed within recent years by the Cambria Steel Co., and now supplies electric power to all of that concern's group of Penn mines at Norway and Vulcan, and the Iron Mountain Electric Co. has latterly undertaken the development of a water power on the Menominee river. At the western end of the Menominee range, the electric plant of the city of Crystal Falls is served by a water power developed on the Paint river, and in the region to the northward the Victoria Copper Mining Co. has a mammoth hydraulic plant on the Ontonagon river. The operation of a water power for the generation of electricity is almost automatic, and the labor required in a large plant per 100 horsepower is so little as to hardly figure in the costs, yet beyond the few projects mentioned there has been no development of water powers in the Upper Michigan mining country.

PYROMETRY IN THE ANNEALING ROOM[1]

The Application of Scientific Methods to the Production of Malleable Iron Castings

By S. H. Stupakoff, Pittsburg, Pa.

The satisfactory production of malleable iron castings depends to a large extent upon subjecting the hard castings to a suitable heat treatment which effects a transition of the originally white iron into the well known soft gray-black variety with surprisingly different physical qualities. It is in the latter state in which it is brought on the market, and it is perhaps the only one of its different phases that is known by the user. The change from hard white into soft gray-black, or "black heart" iron, as it is often called, is effected by a prolonged reheating of the castings, commonly known as the "annealing" process. The annealing or softening of the material is really the principal object sought. However, this softening is only coincident with other chemical changes that take place during this process, which are in truth the primary results of reheating the hard white iron for a specified length of time within definite limits of temperatures. Other physical changes that occur during the same period, such as increase in ductility, elongation, bending moment, tensile strength and malleability, are of even greater value and importance to the subsequent application in the arts of this excellent variety of iron.

It is not the intention to dwell here upon the composition of malleable iron mixtures, as they have been discussed at length by acknowledged authorities on the subject. Suffice it to state that the mixture consists essentially of a low carbon iron with about 0.70 per cent to 1 per cent silicon. The iron on melting under suitable conditions will, after casting, turn out with a silvery white fracture, and extremely hard and brittle. In this condition it is almost absolutely useless for any purpose. Nearly the whole of its carbon contents is present in the combined state, in other words, chemically combined with the iron. The object of the annealing process is to break up this combination and to transform the combined carbon into a non-crystalline graphitic state. As such it will then be present in the iron merely as a mechanical mixture and provided all other conditions are equally favorable, the result will be a malleable cast iron with its well known good qualities.

Hence, during the annealing process we are breaking up a chemical combination of iron and carbon, opposing to the gigantic forces of chemical affinity the subtle agent of heat. Yet, just as the constant dropping of water will hollow the hardest rock, so will the incessant attack of heat pull and push about the infinitely small particles of unrelated materials until each occupies its proper abode. This, however, is by no means so simple a process as the annealing or hardening of tool steel, whereby the carbon and iron-carbon contents are merely changed from one allotropic state into another, and which might be compared for the sake of illustration to changing liquid water into solid ice or into its gaseous form—steam. Either one of these results may be achieved within a comparatively short time by rigidly observing the conditions which are necessary to place the molecules of the material in their desired states of allotropy. There is much more accomplished in the annealing process of malleable cast iron and the changes aimed at during this operation are of a much more radical nature, so that it should not be strange to note that it involves the factor of time as well as that of high temperature.

Researches on the constitution of iron and steel are as recent as 25 years ago, and lie within the memory and practice of most manufacturers of the present day. Little, however, was dreamt of the nicety of equilibrium to which the constituents of our materials must be poised in order to obtain the best results in our products. The knowledge of what can be accomplished by judicious treatment has spread like wild fire throughout the world, manufacturers and consumers alike being fully aware that no product can find a place in the open market of today, unless it comes within the narrow limits of the most rigid of specifications. The manufacturer is compelled to meet the just demands of the wide awake buyer, who is as well, and often better, informed of modern possibilities as he is.

Changes in Structure.

We know that no radical changes from the state of combined carbon to that of graphitic carbon can take place in any of our numerous iron compounds below a certain place in our temperature scale. And we know likewise that the same transition cannot be accelerated after a certain highest point of the scale has been reached. The definite region where such a change commences to become noticeably active is known as the critical range. Its location varies slightly up or down the scale, according to the composition of our material, though in iron and its compounds it depends principally upon its higher or lower percentage of carbon. It is safe to say that its lowest limit does not fall very far below 700 degrees Cent., or about 1,300 degrees Fahr., and its upper limit does not exceed 900 degrees Cent. or about 1,650 degrees Fahr.

It is quite true that there exists a constant transmigration and re-arrangement of the smallest particles (the molecules) of our iron compounds at far lower, and perhaps at all temperatures; but they are of no moment to the producer nor to the user of malleable iron. They may be of scientific value, but they are certainly too insignificant to be taken seriously into consideration in practice. This is far different when we come to deal with some of the physical changes which take place in the course of time in some of our steels. And we may refer particularly to some special finished products used for electrical purposes, as permanent magnets. It is well known that these assume their permanency only after a considerable lapse of time—several months, which again depends upon conditions of temperature at which they were kept to age them. And it is equally well known that this so-called ageing of steel can certainly be effected at as low a temperature as that of boiling water. However, a change of the molecular arrangement of the constituents of iron or steel, as that of changing one form of carbon or iron, or their compounds, into other allotropic forms, can only take place at considerably higher temperatures.

[1]Read at Cincinnati meeting of American Foundrymen's Association.

These remarks are given here merely to show that, after all, we are not dealing in our commercial iron and steel with as exceedingly simple bodies as they are ordinarily assumed to be. In fact, as soon as we attempt to delve into the profound depth of their molecular constitution, as soon as we lay bare the laws of their existence and try to explain the phenomena we see, we meet with almost insurmountable obstacles and perplexing complications.

And as the course of the practical man lies along the path of all these uncertainties, is it not most natural that in his dilemmas he should call in the aid of the scientist for his enlightenment? The first advice that he receives is to abandon his old hit and miss methods. All steps in the manufacture of his products must be conducted upon the basis of correct principles. There is no possible chance of attaining the desired ends if it is attempted to accomplish miracles, or what is the same, to attain definite results by means which are contrary to natural laws.

The manufacturer of malleable cast iron has long since submitted to the necessity of relying upon the services of a trustworthy metallurgist, who selects his mixture from among various grades of iron, calculates the necessary quantities of each, basing his work on a careful chemical analysis of the raw materials as well as of the product. But the conscientious chemist is fully alive to the fact that the best brands of iron, the most suitably compounded mixture and the most carefully executed analysis alone will not result in a good product. There is the melting process in all its details to be duly taken into consideration, and this is usually left to the "judgment" of the melter. Last, not least, we have in the annealing process one of the most important stages in the production of malleable iron which govern the physical qualities and the commercial value of the product.

And these all-important stages of heat treatment of malleable iron are left—even now—in many establishments, to the fallacious personal judgment of a few operators, whose principal qualification is that they have grown up in the business. Who would question the fact that the success or failure of each individual heat in foundries conducted on these lines depends almost exclusively upon the personal skill, the good will, state of health, mind and disposition of a few trusted employes?

The *Electrochemical and Metallurgical Review* brought out in October, 1906, an editorial that fully covers the situation. It is an exposition of close observation and a masterpiece of deep thought, common sense reasoning and full of expression, which the writer recommends to the careful consideration of all the manufacturing world. It says:

The Practical Man's Limitations.

"The practical self-made man has acquired a faculty of feeling or perceiving by intuition whether his process works correctly or not. Such knowledge is stored in him and it will die with him. This fact makes him liable to underestimate or wholly misunderstand thevalue of scientific methods. This is his mistake. But in many cases if we see what has been accomplished simply by consistent hard work with rule of thumb and try and miss methods, we can not but admire the man who did this work. Yet it remains a self-evident truth that we must get away from the rule of thumb, and must use instead exact scientific principles. The times have marvelously changed, and while we must admire the 'practical man' of the past, the future belongs to the man whose work is based upon scientific principles. The practical furnace man in a metallurgical works of the past saw with his eyes whether the metal was at the right temperature. He did his work faithfully and successfully, but when he left the plant his knowledge went away with him. Now in the period of pyrometers, a works is enabled to get a permanent record of the right succession of temperature during a process. It is thus possible to repeat a successful process from the written record after success has once been established—and the plant is independent of the individual man. This illustrates clearly the industrial progress which has been made, and which is wholly the result of scientific progress."

And this is the very point aimed at in this paper. It is the intention to impress upon all interested parties that, since trustworthy instruments are available for following up the various stages of the heat-treatment of our materials, we should use them freely and intelligently and thereby become independent of the personal factor. Even the best of such services, most faithfully given, can not be free from mistakes. And errors, whatever their cause, and whatever their extent, cost more or less money. This money is lost by the manufacturer alone, while the wages of the mechanic go on as if nothing had happened. And the same pleasant relationship prevails until one or the other of the two parties concerned tires of it and steps out. Then there is change for worse or better. A new hand steps in, and he is given a chance for a month or more—at the expense of the manufacurer—to become acquainted with the methods, the appliances, the working of the furnaces and the running of the plant. After that it depends in part upon his experience and his skill, but especially upon his "good luck," whether there is a material improvement in the quality of the product and in the profits of the business or not.

But why depend upon the fallible judgment of the individual if there is no necessity for it? There is ample opportunity for the mechanic to make good use of his skill in other directions than "guessing" at the most suitable thermal conditions during the various stages in the manufacture of his products. This task lies not within his province, it extends beyond the limits of the unarmored senses of man. Man's senses were never intended for such conditions, they were not developed for it, they are not adapted to it, and they are not fit for it.

Fallibility of the Senses.

The easiest manner to prove these assertions to you by your own experience may be by recalling a few well known examples from physics, which every one of you has learnt while still at school. Step from broad daylight or from a brightly illuminated space into a dimly lighted room, and all things appear indistinct, whereas you can recognize without trouble even the smallest details if you enter the same room from the dark. Touch in a Turkish bath room with your bare hands or feet substances of different natures, like straw matting, woodwork, stone flooring or metals, and you will experience remarkably different sensations. They may lead you to think that all have widely differing temperatures, whereas the application of a thermometer to either one of them will show you that the temperature of all is exactly alike. Make the same experiment in a refrigerating room, and you will experience sensations of an exactly opposite nature. Fill three basins with water, one at 32 degrees, the second at 90 degrees and the third at 160 degrees Fahr. Place both hands in the basin with water at 90 degrees. After a short while you will not be conscious

that your hands are in contact with anything; you will feel no heat. Then plunge one hand into the cold water and one into the hot, keep them there until they have assumed these temperatures, and then change both hands over into the water of 90 degrees. Now, if you were to believe your senses, one of your hands would make you believe that the water is hot, and the other one that it is cold.

Example after example of the same or similar nature might be cited, every one of which would furnish you with positive proof of the fallacy of our senses; but I believe that the above, which have been selected from the ranges within our natural state of condition, should be sufficient evidence to you that it is entirely beyond us to approach with our judgment even approximately within reasonable limits of conditions that lie out of reach of our unprotected or unarmored organs.

This object can be attained only by the employment of suitable physical instruments, and in our present particular case by the judicious use and correct application of high temperature measuring instruments. We can make our selection from among a number of different types.

Instruments Available.

The Siemens water pyrometer, which was perhaps the first practical instrument for the purpose, is somewhat out of date, but still as good as any if used intelligently. It is not as convenient as the more modern types of pyrometers; it gives no permanent indications of prevailing temperatures; it can not be handled easily by an ordinary workman, and it takes from 15 minutes upward to determine the temperature desired. But, when carefully handled, its reliability comes fully within admissable limits of malleable iron practice, and it is certainly reasonable in price.

Seger's cones or Wiborgh's thermophones may be used in annealing furnaces to some advantage in cases of emergency, if no better means are available. They will serve to give an approximate indication of the time when the highest admissable temperature has been reached. They are only good for a single application and must then be replaced by new ones. But they are cheap and they can be handled by an ordinary workman. It is good practice to keep a few sets of these little tell-tale cones on hand, whether there is an immediate use for them or not. Conditions are sure to arise sooner or later in the best regulated establishment when it will be considered a blessing to be able to lay one's hands on them.

Mercury thermometers are now obtainable reading up to nearly 1,000 degrees Fahr. They are made of a special grade of (Jena 59^{III}) hard borosilicate glass, and are nitrogen filled. They lie below the range of malleable iron annealing furnaces, but they may be useful for regulating the temperatures of core ovens, and they are sometimes quite serviceable for application in some stacks and flues. They are made in a number of different shapes and when equipped as mechanical fixtures they are adapted to be permanently applied suiting various conditions. It is obvious, that, owing to the fact that they are partly constructed of glass, careful handling is necessary to avoid breakage.

Mechanical thermometers form a class of heat measuring instruments distinct by themselves. They are mostly constructed upon the basic principle of the unequal expansion of two different metals when exposed to varying degrees of temperature. The expansive force is transmitted to a pointer which mov s over a graduated scale just like the hand of a clock or that of a pressure gage. These instruments are constructed entirely of metal, excepting that the pointer and dial is covered by a disc of glass. They are rugged, are not easily damaged, reliably accurate within fairly reasonable limits, and suitable for indicating temperatures up to about 600 degrees Fahr. They are therefore adapted for use in malleable iron foundries in core ovens which are well under control, in pitch and enameling furnaces, in high and low pressure steam lines which may be used for drying, for heating or for any other specific purpose that comes within their range.

It may not be out of place to insert here parenthetically that "thermometers" include all instruments for any range of temperature from the lowest (the absolute zero) up to the boiling point of mercury (676 degrees Fahr.), while others that are adapted for ranges higher than this point are usually designated as "pyrometers."

Expansion pyrometers are constructed upon the same general principle as the foregoing class of mechanical thermometers, but as their name implies, they are intended for higher ranges of temperatures. They enjoyed for many years quite an extensive distribution and use in many branches of the industries, but within the last two decades they were compelled to make room for the more modern types of instruments. When used for short periods of exposure up to within moderately high limits they give reasonable close indications. The claims usually made for them should be accepted with caution, and it is always advisable when using them in practice, to remain considerably below their given maximum to avoid permanent setting of their vital parts. Provision is made in most instruments of this type to take up a permanent set by means of adjusting screws. However, before these means for readjustment are resorted to it is necessary that the instrument be allowed to cool to normal temperature.

Electric resistance pyrometers are of modern construction. They are exceptionally sensitive to small variations of temperatures, and they give very close and trustworthy readings when judiciously used within their limits. They must not be exposed to temperatures above 1,200 degrees Cent., as this would cause a permanent change in the resistance of their vital parts, necessitating recalibration. Their usefulness extends consequently over the whole range of annealing temperatures, but not high enough to be practical for measuring the temperatures of iron and steel and their alloys in the molten state. The active portion of these pyrometers, consisting of a coil of fine platinum wire, must be protected against the action of furnace gases by an impermeable sheath or covering. And as there are no highly refractory substances which will accomplish this excepting some special porcelains or pure silica, which are all of a brittle nature, it stands to reason that these instruments must be carefully handled. This, however, is a feature present in all high class temperature measuring instruments that are directly exposed to the sources of heat. It is unavoidable, and this alone should be no good reason that they be condemned and barred from use in industrial establishments.

Thermo-electric pyrometers compose another distinct class of modern high temperature measuring instruments. They offer many advantages over others of their kind. They are certainly the simplest in construction, they are easily handled and easily applied, and they can be used in numerous instances where it would be impossible to make use of pyrometers of any other type.

Unreliable Instruments.

The fact that almost any two metals of different nature or of different

composition, when joined, will cause the appearance of thermo currents upon heating this junction, has induced many enterprising firms to bring instruments of this kind upon the market which are supposed to offer many advantages over others that have earned deservedly universal reputation. However, in the majority of these imitations (?) the fact has been overlooked, that the physical quality of changing heat waves into electrical waves alone, even if applied to practice by the most skillful mechanic, is not sufficient to produce a reliable scientific instrument for "measuring temperatures." It is true, there are some that are quite trustworthy within their specified limits, but for most of them entirely too much is being claimed. This does more harm than good, and it is quite frequently the cause of arousing suspicion as to the reliability of the better class of instruments of their kind. There is no question that it would contribute considerably to the general spread of practical pyrometry, if the distribution of such faulty instruments would receive less encouragement. The writer has in his possession a report from the highest authority on such matters on the test of one particular make of these thermo-couples, which, by the way, are extensively sold in this country, that says among other things: *"They are not at all suitable for the measurement of temperatures."* There is no doubt that our own highest court of appeals in such matters, the bureau of standards, at Washington, D. C., would corroborate the above if their opinion should be solicited.

There are an amazingly small number of materials among the 70 odd elementary substances and their innumerable combinations that, when connected in pairs, will meet all the requirements of a good thermo-electric pyrometer. The best so far devised is that consisting of one wire of pure platinum and one of pure platinum alloyed with 10 per cent rhodium as suggested by Professor Henry Le Chatelier, of the School of Mines, at Paris, France. It is considered by all physicists the standard of measurement for high temperatures up to about 3,000 degrees Fahr., and it unquestionably supersedes all others in constancy and accuracy from about 300 degrees Fahr. to its upper limit.

Thermo-Couples.

Among thermo-electric couples there may be further mentioned the iridium-ruthenium and the platinum-iridium couple. The former can be used for temperatures higher than 3,000 degrees Fahr., but it is exceedingly brittle and therefore not well adapted for use in industrial works, though it is undoubtedly of a high scientific value. Platinum-iridium couples have a smaller range than Le Chatelier's platinum-rhodium couples. This is owing to a change of their thermo-electric constants which occurs at about 1,800 degrees Fahr. on account of the volatilization of the iridium that commences about at this stage. Trustworthy for lower ranges of temperatures are copper-constantan, silver-constantan and iron-constantan thermo couples. (Constantan is an alloy of 60 per cent copper and 40 per cent nickel.) Neither one of these latter couples, however, can be seriously recommended for use above 650 degrees Cent. or 1,200 dgrees Fahr.

Optical pyrometers are constructed upon the laws of relationship between heat and light. They are in fact instruments that measure the degree of light that is emitted by a hot body, and this is transposed by some convenient means into degrees of temperature. It would seem that this method offers a decided advantage over other instruments made for the same purpose, inasmuch as the instrument is not required to be brought in direct contact with the source of heat. But this property alone, if not combined with simplicity of construction, ease of handling and maintenance would not fill the requirements of every day shop practice. At the present time there are but few commercial optical pyrometers that possess these qualities combined, and most of them remain therefore so far only excellent laboratory instruments, which in the hands of a careful operator give surprisingly accurate results within ranges that are far beyond the reach of other instruments for the same purpose. There are, however, a few types of optical pyrometers made that are very simple in construction and easy of manipulation, which may be used by almost any man of ordinary intelligence. But it should not be forgotten that due allowance must be made in all optical pyrometers for personal errors of observation which vary sometimes considerable with different, and occasionally even with the same individual observer.

Radiation pyrometers, like optical pyrometers, are used at a distance from the source of heat that is to be measured. They are therefore not subject to destruction by fire or furnace gases and will last indefinitely if guarded against mechanical injury. No part of the instrument is ever heated above 80 degrees Cent. or about 180 degrees Fahr. Their construction is based upon the principle of measurement of the total radiations of heat—not light, as in the foregoing—of substances located under conditions known as those peculiar to a black body. The heat rays are collected by a mirror located within the instrument and, then concentrated into a focus where the hot junction of a sensitive copper-constantan couple changes them into electrical waves, the electromotive force of which is subsequently measured by a sensitive d'Arsonval galvanometer. The scale of this indicator is expressed directly in degrees Fahr. or Cent., as the case may be, and there is no transition of the values into any other denomination necessary. This makes the instrument a very convenient contrivance for the direct determination of the highest attainable temperatures.

Miscellaneous pyrometers based upon the laws of expansion of air, the dilution of liquids and gases and the variation of the viscosity of gases—all under different conditions of temperature—have also been made, and have found some application in practice, but in a comparatively limited way only. The graduation of these instruments is purely empirical, as they are somewhat cumbersome, more or less complicated and expensive. It is certain they have not found much favor in annealing practice, and they are rarely—if at all—found in malleable iron or steel foundries.

Fusible alloys, made of precious metals, have been occasionally employed for the determination of high temperatures; but, excepting in dentistry, their application in practice has been almost entirely abandoned. Therefore it would appear that merely mentioning them in this place should answer our purpose. This ends the list of high temperature measuring instruments. All have had their share of fair trials, some have found practical application in our industrial establishments, and, though it can not be said that our tests have been concluded, there are at the present but a remarkably small number of types that have gained a solid foothold in our factories with fair prospects for permanence.

(To be continued.)

One hundred and fifty thousand tons of iron have been shipped recently from Stockholm, Sweden, to America. This is the first consignment of any magnitude of the product.

THE DEPARTMENT OF APPLIED SCIENCE AT THE UNIVERSITY OF SHEFFIELD.

The University of Sheffield has arranged to supplement its scientific courses by a completely equipped department of applied science, which is said to be the most complete of its kind in existence. The equipment, which is entirely housed in buildings specially erected to receive it, includes the following:

Latest form of Siemens furnace, of two tons capacity.

One-ton Bessemer converter, with bottom-blowing, side-blowing and surface-blowing fittings.

Gas-fired crucible melting holes, Siemens patent.

Crucible steel house, with coke-melting holes, pot house and pot-making tools.

A Kjellin electric steel furnace.

Annealing furnaces, Clinch-Jones type and ordinary type, for the annealing of steel castings and the production of malleable cast iron.

Electro-pneumatic hammer, 700 pounds, capable of working sizes up to 4 inches square.

Re-heating furnace.

One iron cupola, 46 inches diameter, drying stove, and all foundry equipment for the production of iron and steel castings.

Fifty-ton single lever machine, for tensile, transverse, crushing and torsion tests.

Air compressor, 2,000 cubic feet per minute capacity, and one rotary blower (Root type).

Hardening and tempering installation for tools.

Forge, drill and necessary apparatus for the quick estimation of elements in the bath in working Siemens furnace.

A machine for making vibratory tests of steel.

One bay of the steel works is spanned by a 4-ton traveling electric crane.

The compressor, blower, converter and machines are worked by separate two-phase electric motors.

The object kept in view in designing the chief practical laboratory was to secure, on an adequate manufacturing scale, a plant that would produce steel by the standard methods of manufacture—crucible, Bessemer, Siemens and electrical, and which would enable the student to scientifically examine the metals produced chemically, physically and microscopically.

The crucible plant consists of a six-pot new form Siemens gas furnace, capable of melting 360 pounds of steel at one time. Economy of fuel is a marked feature. The Siemens furnace, also new in form, is equal to heats of 2½ tons. Here also economy results, the gas retaining the initial heat of the producer, and there is complete combustion of the tar, etc. The entire regenerative surface is utilized for heating cold air.

The Bessemer plant consists of a 1-ton converter, made to take a very shallow, bottom-blown bath, a side-blown heat by the Robert modification, or a surface-blown heat by the Tropenas method. The blast reservoir consists of a 20-inch underground main, 65 feet long. The blowing engines have three cylinders 28 inches in diameter, with a 12-inch stroke. They deliver 2,750 cubic feet per minute of free air, or 2,000 cubic feet per minute at a pressure of 5 pounds per square inch. The valves are moved positively, the pistons being single acting, and the cylinders water-jacketed. The engine is driven by a 115-horsepower two-phase motor.

The cupola, which serves both for the converter and ordinary cast iron foundry work, is made by the Whiting Foundry Equipment Co., of Chicago, and has a drop bottom. The main shell is 48 inches in diameter, lined up to about 39 inches. The blast is supplied by an improved Root blower, being driven by a 15-horsepower motor, and the blast pressure is regulated by means of water resistance.

Supplementing the main equipment is a hydro-carbon heat treatment muffle, which is connected with the Uehling pyrometer; also a 20 foot-ton falling weight apparatus, on a mild steel bed block, made in the laboratory and weighing 2¼ tons. The smiths' shop contains two drills for drilling spoon samples and ingots. Specially notable is an electrically-driven pneumatic hammer, the weight of which is nominally 700 pounds. It is, however, more nearly half a ton. It is driven by the blowing engine motor, is provided with a coal-fire re-heating furnace, and is capable of working 4-inch ingots and striking 100 blows per minute.

A Cochrane boiler works the injector jets of all the furnaces. All the other power is electrical, two-phase current being supplied by the electrical department of the city corporation. In the foundry is a 4-ton three-motor crane.

There are two practical laboratories. The small one contains the only portion of the 1890 plant which has survived. Here are a reverberatory annealing furnace, a four-pot coke crucible furnace and apparatus for the manufacture of white crucibles.

The chemical assay laboratories are four in number. They provide accommodations for 102 students working at one time. In the laboratories is a specially-fitted post-graduates' laboratory, accommodating eleven students, and designed for the use of managers and chemists in works who may wish to specialize after graduating, as has been already mentioned.

The mechanical testing apparatus consists of a 50-ton single-lever Wicksteed machine, with two centers, thus capable of registering tensile, compressive, transverse or torsional stresses in either 3-inch or 12-inch-ton moments. An alternating stress apparatus works up to nearly 800 alternations per minute, applying a skin stress slightly beyond the elastic limit, the energy necessary to produce rupture being measured by a delicate integrating watt-meter, capable of making thirty or forty tests per hour. Thus the Wohler test comes into the possibility of everyday metallurgy.

The micrographic installation consists of a battery of six 4-inch polishing blocks, motor-driven. The eleven microscopes include the latest Zeiss photomicrographic apparatus, illuminated by a powerful Nernst lamp, and having objectives of a resolving power up to a numerical aperture of 1:40.

The pyrometric installation consists of a central station Le Chatelier pyrometer, which can be connected by means of a switchboard to any of the practical or laboratory furnaces; a Uehling pyrometer, with Steinhart recorder, connected with the heat treatment muffle; a portable photometric dial pyrometer; optical pyrometers; a Paul portable pyrometer; Siemens copper ball pyrometer and Segar cones. In connection with the central station Le Chatelier installation is a furnace for measuring recalescence in vacuo, together with a keyboard and an electric chronographic recorder.

Geology and mineralogy being compulsory pure sciences in the metallurgical course, the students are provided with a set of petrological microscopes and rock section cutting and polishing apparatus, crystal models, hard specimens of rock and minerals, a collection of typical fossils, and detailed geological maps and sections of the district. These are in the practical laboratory.

As indicating the extent of research work in the department, it will be interesting to learn that in the sixteen years since 1889 the staff and students have been responsible for the publication of some thirty original researches.

The following additional appliances have recently been added to the plant:

A Kjellin electric melting furnace, with magnesia lined, annular crucible to melt 300 pounds of steel; a plumbago crucible to melt 100 pounds of cast iron or alloys; a Brayshaw duplex salt bath, hardening and heat treatment

gas furnace, for ordinary steels up to about 1,000 degrees Cent., and an electric salt bath hardening furnace for higher temperatures to cover 1,300 degrees Cent. for high-speed steels.

With such a large and varied set of furnaces and appliances at their disposal, worked by themselves under capable instructors, it is manifest that the students who devote themselves earnestly to the course cannot fail to acquire both scientific and practical knowledge of priceless value to themselves and to their future careers. Here they take the raw material in the shape of ore, ascertain its exact chemical composition, smelt it and turn it out as metal, accounting in the process for all the reactions undergone, the metallic results and the waste, exactly as later on they would have to do as managers.

THE PIPING SYSTEM OF THE NEW GARY PLANT, INDIANA STEEL COMPANY.

The carefully planned piping system at the Gary works of the Indiana Steel Co. has many points of interest to engineers aside from the great extent of the work. A description of this plant would be incomplete without due reference to this part of the work; we therefore supplement previous articles which have appeared in THE IRON TRADE REVIEW dealing with other phases of the engineering features of this plant, with the following facts regarding the piping system furnished by the Best Mfg. Co., Pittsburg, to which the contract for this work was awarded.

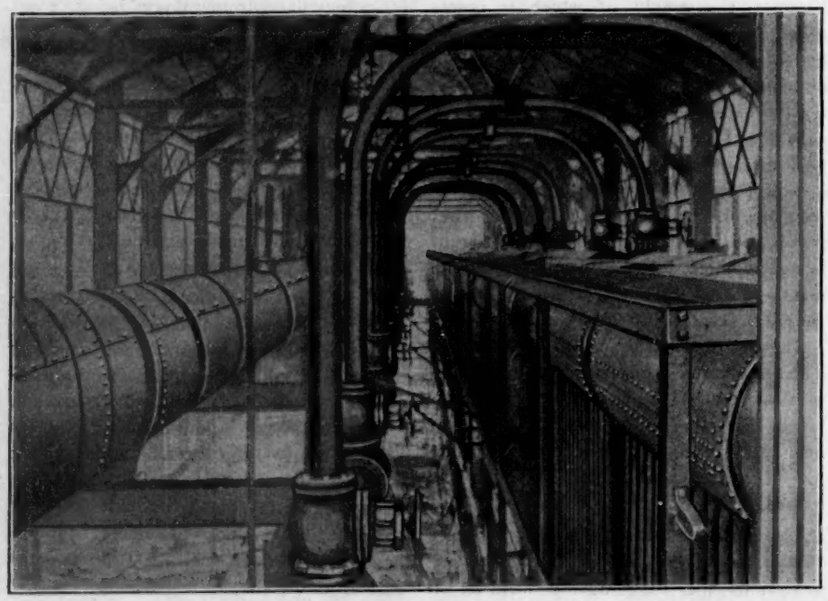
As the continuous successful operation of the plant would be seriously interfered with by a failure in the main water system, it was deemed advisable to use steel throughout. The 42-inch main in the pump house was made of cast steel flanged pipe, all outside of this being of soft rolled steel. The lines branching from this 42-inch cast steel main were 26 inches in diameter, of the lock-bar type; the plates for same being rolled 7/16 inch thick. From these the lines reduced to 30 inches, 24 inches, 20 inches and so on down to the smaller sizes. All pipe 30 inches and under are of wrought steel of National Tube Co.'s manufacture. Rolled steel flanges were shrunk and pened on all pipe laid above ground, which was 14 inches and larger in size. Underground piping was all protected by a coating of tar, inside and outside, the pipe being first heated to a temperature of 200 degrees Fahr. and then dipped vertically in a bath of pure coal tar heated to 360 degrees Fahr. On these lines rolled steel flanges were shrunk and pened on sizes 8 inches and larger.

The hydraulic lines were all made of extra heavy rolled steel pipe beginning with 12 inches in diameter at the pumps. The 14-inch main header is of cast steel, from one end of which a 10-inch extra heavy line is taken and carried to a point near the skull-cracker of open-hearth building No. 4, where this line is divided into two 8-inch lines, one leading to open-hearth No. 3 and the other to open-hearth No. 4. Extra heavy 6-inch mains run the full length inside these buildings with 2½-inch connections to each of the 28 manifolds, each of which again has six 1-inch outlets for operating the various cylinders in connection with furnace doors, air and gas valves. All these lines are used under 1,000 lb. constant working pressure.

From each of the sixteen boilers 8-inch bends are led up and over to a 15-inch header running the entire length of the boiler room, reducing at one end to 12 inches, and this size is continued into open-hearth building No. 4. From the other end 12-inch pipe is again used, running to the south end of the blowing engine room, furnishing steam to the boiler feed, centrifugal and hydraulic pumps. The 12-inch size is also used through 30-inch receivers to each of the two 2,000-kilowatt steam turbines. It is then reduced to 8 inches and continued with this size to open-hearth No. 3. The larger sizes of steam pipe were connected by rolled steel flanges shrunk and pened on.

From the center of the 15-inch main, 12-inch lines furnish the power to the two steam-driven blowing engines.

Extra heavy rolled steel pipe is used in the boiler feed lines throughout, as also in the blow-off. The exhaust from the hydraulic pump to the condenser is carried through 20-inch rolled steel pipe and that from the large gas engines through 32-inch x 18-inch fittings connected to a 50-inch riveted steel exhaust main, leading into a large concrete muffler.



STEAM PIPING IN BOILER ROOM.

New Mill at Economy, Pa.—The Central Tube Co., Pittsburg, which was recently incorporated with a capital stock of $350,000, expects to have its new mill at Economy, Pa., in operation early in September for the manufacture of wrought pipe, nipples, etc. Walter F. Ingals has been engaged as manager of sales of the company. He has had a wide experience extending over 11 years with the National Tube Co., and left the employ of the latter company July 1 to take up his new duties. The company will be represented by Messrs. Olin, Giberson & Hilands, No. 2 Rector street, New York, in the New England States, New York, eastern Pennsylvania, Virginia, Maryland, New Jersey, Delaware and District of Columbia.

Tungsten Development.—It is announced that a tungsten refinery will shortly be built on the Melvin group of tungsten claims at Round Mountain, Nevada. The only mill at present refining tungsten ores in this country is situated at Boulder, Colo. Other mills for treating tungsten ores will, if present plans materialize, be built at Murray, Ida., and at Deer Park, Wash.

PRINCIPAL FEATURES OF A 1,200,000 LBS. CAPACITY TESTING MACHINE[1]

With Special Reference to a New System of Transmitting the Pressure Developed in the Hydraulic Cylinder to the Scale Beam

By Thorsten Y. Olsen.

During the past year a new type of testing machine has been developed, which makes a step in advance in the construction of high pressure testing machines.

This type has thus far been developed primarily for compression tests, but in the near future, such a machine will be built to cover not only compression tests but tensile and transverse tests as well.

The main feature of this machine is the new system of transmitting the pressure developed in an hydraulic cylinder to a scale beam.

The standard commercial lever testing machine of today weighs the entire pressure directly on a series of three main levers from which it is transmitted to the scale beam.

The size of these levers and consequently the size of any desired machine is governed to a large extent by the length of the primary knife edges, the pressure of which must not exceed 10,000 pounds per linear inch.

Owing to the size, weight and consequent cost of weighing systems on this principle, as well as for mechanical reasons, I would limit the size of this type of machine to 1,000,000 pounds capacity.

The high cost and consequent lack of large testing machines has limited research work and deprived the engineer of data he now requires.

Any testing machines, to be of value as such, must have accuracy, and must apply the load in such a manner as to uniformity and speed that the specimen will be subject to perfect conditions of loading. The method of support and of adjustment is also of great importance.

All of the above qualifications apply more to the compression test than to any other and assume a far greater problem in a large testing machine than in a small one.

Some large processes have been equipped with gages to weigh pressure and thus used as a testing machine, but this arrangement is not altogether satisfactory as the gages are neither accurate nor reliable and the readings exceedingly coarse. From a cost standpoint this has been the only means of obtaining information on the strength of large specimens.

The testing machine I now wish to describe was designed especially for the new testing laboratory of Rensselaer Polytechnic Institute of Troy, N. Y., where it is now in successful operation.

The capacity is 1,200,000 pounds and it covers the required points as previously outlined and I will show by the tests performed the degree of accuracy which may be maintained.

Description of Construction.

In describing the construction I will divide the machine into four distinct parts:

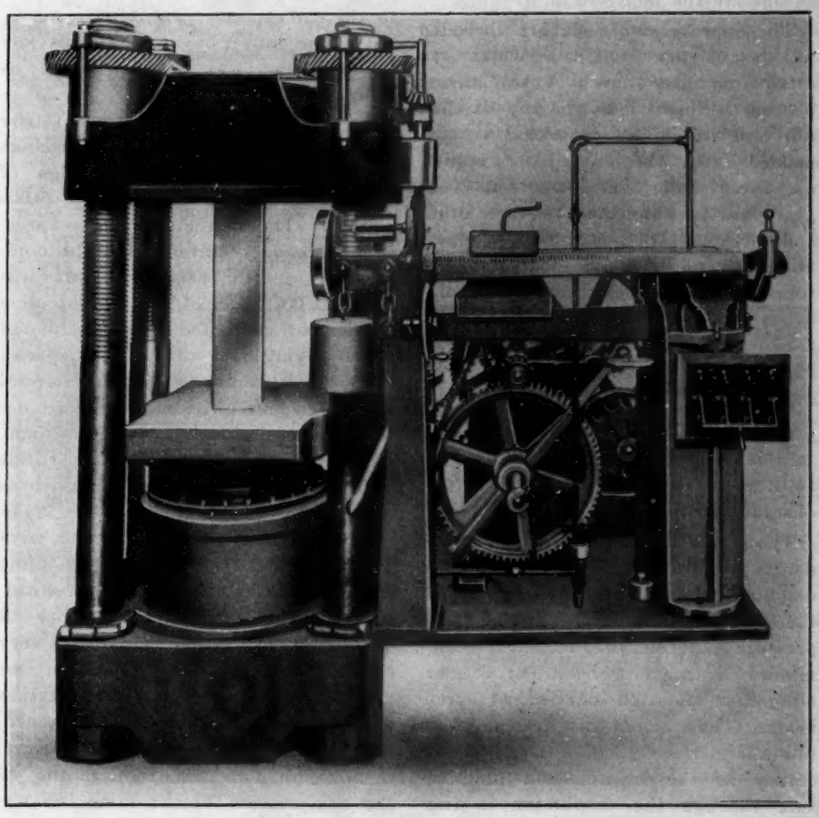
1. Press power.
2. Pump and motor drive.
3. Adjustment of upper head.
4. Weighing mechanism.

The press proper needs but little description as in general construction it resembles an ordinary press. The crossheads, cylinder, piston and weighing platen are steel castings and the four tension rods of 0.40 carbon steel. By thus making all the heavy parts of steel the weight and overall dimensions are much reduced, which is an advantage in such a large machine.

The cylinder casting is separate from the base crosshead which facilitates handling and the piston has an extension which fits into the base and is thereby guided.

An important factor in the cylinder is the packing which is of entirely new design. This new form is absolutely tight and develops a uniform amount of friction at all points under any certain loading. The packing is so constructed that the friction necessary to prevent leakage varies directly with the pressure, thus eliminating the friction as a factor in the weighing system, being cared for in the standardizing of the poise on the scale beam.

To provide an even bearing for the test specimen the weighing table is



1,200,000-Pound Capacity Compression Testing Machine.

[1]Paper presented at Atlantic City meeting of American Society for Testing Materials,

provided with a spherical adjustment on the top of the piston.

Pump and Motor Drive.

A uniform application of load is an essential point, especially in a compression test of concrete or like material and with this point in view a special form of pump was devised. This pump consists of a long steel cylinder in which a piston is forced by means of a screw operated through a series of gears by a direct connected motor drive. Through this gearing four different pump speeds may be obtained, one, exceedingly fast for filling purposes as well as for applying low loads. An automatic cut-off is provided at either end of the stroke of the piston so the pump can in no way be injured. The pump packing is placed in such a position that it may be replaced in a very short time.

With one stroke of the pump the press piston is raised one-half inch which is sufficient to break any concrete, or stone specimen which may be placed in the machine. Should more motion be required provision is made for maintaining the pressure in the cylinder and of quickly refilling the pump to provide the motion desired. A two-horsepower motor is sufficient to operate the pump to the full capacity of the machine as well as operate the upper head.

The four tension rods are threaded at their upper ends, on which are fitted four gear nuts. A ball thrust bearing is inserted at the top of each nut and the upper crosshead is suspended from the cover-plate resting on these ball bearings. The four gears are so connected to each other and the source of power that by operating a hand lever the four nuts are rotated simultaneously and the crossheads quickly raised or lowered to the desired level.

The Weighing Mechanism.

The method of weighing the load in this machine is of special interest, as it is a departure from all previous methods.

The pressure in the main cylinder is transmitted to and acts on a diaphragm which is exactly 1/25 of the area of the main cylinder. The pressure on this diaphragm is communicated to a lever system terminating in a standard dial vernier screw beam. The amount of pressure is in this manner weighed with great accuracy as the transmission of pressure through the diaphragm is frictionless. The friction in the main cylinder is very uniform and owing to the type of packing, as mentioned before, is fully considered in the method of calibration. The variation of the friction due to the packing under any load is so small as to be negligible.

Methods of Standardization.

To standardize and determine the accuracy of this machine we used two methods. The first method was the same as is used in calibrating all testing machines today; the use of standard levers and weights. The levers used were of special design and made of steel with a count of 20 so that by mounting them in the machine and applying 50-pound weights, a maximum load of 100,000 pounds was readily applied to the platen of the testing machine. The poise was made the correct weight to correspond to the weights applied. To obtain great accuracy in this calibration all the readings and beam balances were noted with the piston in motion, which is the condition under which the weighing is done, in the actual usage of the machine. With the poise the correct weight, the beam weighed with great accuracy all increments of load placed upon the platen by means of the standard levers and thus was proved correct to 100,000 pounds and it would be more than safe to suppose the machine correct to the full capacity of 1,200,000 pounds, but to be fully convinced of this fact the machine was further tested as follows:

A steel specimen 3 inches square in section was placed in the machine and compressed, taking readings of the compression for each 20,000 pounds. The increments of compression were very uniform and the compression up to 400,000 pounds was within 0.001 inch of the compression on the bar using the same instrument and applying the same pressure with the 600,000 pounds capacity universal four-screw lever testing machine described before this society a year ago. As it was not advisable to test this steel bar beyond 480,000 pounds three other pieces of steel and three additional similar compressometers were placed between the heads on the specimens and pressure applied. Readings were taken by increments of 60,000 pounds and found to be very regular up to the maximum of 1,200,000 pounds and the compression of the specimen previously mentioned, thus loaded with the other three pieces, was within two ten thousandths of the compression of the same bar under 300,000 pounds load, when compressed by itself. The tests thus made seemed to show the machine more accurate than any available means of measuring the compressnon.

The experiments and tests as noted above show the accuracy of the weighing system, for which we claim an accuracy exceeding one-third of 1 per cent.

The sensitiveness of this machine is also very great, as on testing with the beam in perfect balance the pressure of the hand on the testing table will cause the beam to vibrate. The accuracy of this type of weighing we find to be as great as that of the standard lever testing machine, lacking but little of the same sensitiveness.

Predictions of Larger Machines.

In connection with this large machine let me mention the 10,000,000-pounds capacity compression testing machine now under construction for the United States geological survey, which is of the same general type as the machine outlined.* With the knowledge of what the smaller machine will do the success of the larger one is assured, and it is safe to predict it will exceed all expectations as to accuracy. Many novel features have been devised for staying the machine and for ease of setting and of adjusting specimens. Each detail has been made a study so as to make the machine as near perfect as possible in every respect. In conclusion let me say testing of full size structural members is assured. Testing machines far more accurate and reliable than required either in practice or in research work can be obtained at a reasonable cost by this type of construction.

Useful Diplomacy.—The president of one of the largest pig iron consuming corporations in Connecticut, which is shipping immense tonnages of hardware abroad, informs the Boston *Financial News* that one of the largest orders taken in years for export trade came from a big house in Constantinople whose executive head wrote: "You may credit the sending of this order to the United States to my valued friend, the Hon. Oscar S. Strauss, who besides being a great American is one of the very best friends Turkey ever had in helping on its commercial development. His efforts have certainly put millions of dollars into the coffers of Americans that would otherwise have gone to European manufacturers."

*See IRON TRADE REVIEW, Feb. 11, 1909.

TWO GIANT ELECTRICALLY-DRIVEN POWER SHOVELS.

Two of what are believed to be the largest electrically operated power shovels ever constructed, having buckets of 4 cubic yards capacity, have recently been built by the Vulcan Steam Shovel Co., Toledo, O., for the Dolese & Shepard Co., of Chicago, for handling rock in its limestone quarries.

The hoist movement of these 110-ton machines is actuated by a 200-horsepower 220-volt series wound direct-current Westinghouse type M. T. mill motor running at 415 revolutions per minute; the thrust motor, controlling the movement of the dipper handle, is an 80-horsepower machine of similar type; while the swing boom is operated by an 80-horsepower motor. Each motor is controlled independently by Westinghouse type "A" automatic magnetic switch controllers which secure great nicety of operation of the heavy bucket. This form of control protects the motors from heavy overloads which may result from the bucket striking solid rock or other obstructions, by opening switches to introduce resistance into the motor circuit. The central panels and resistances are mounted in the rear of the cab, while the controller handles are conveniently placed under the hand of the operators.

The hoist and swing-boom motors are mounted within the car. The digging motor is placed out on the boom, communicating its motion to the dipper handle through gearing connected to a pinion engaging a rack on the handle. The power circuit to the shovel is completed through a feed cable, carried on a retractible reel in the shovel cab, and through the rails on which the shovel advances. The shovel may also be fitted with a standard trolley for deriving power and for propulsion on ordinary electrified track. The machine may then attain a speed of 5 miles an hour.

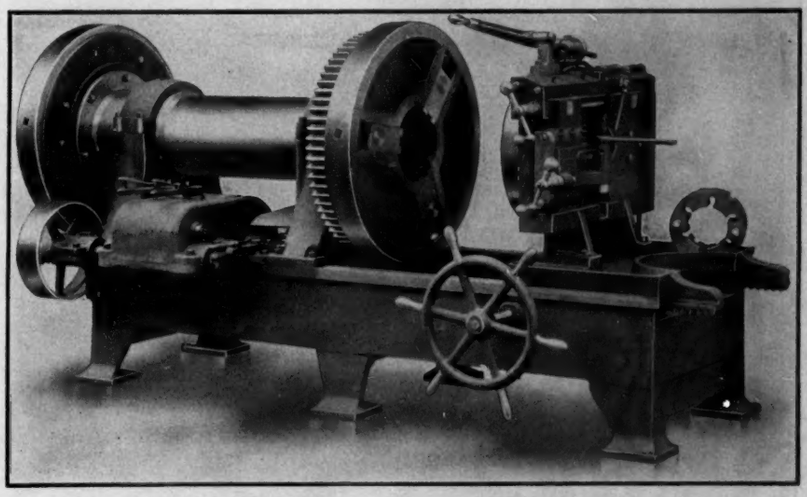
Compared with the steam shovel, the electric-driven excavating apparatus is said to present marked advantages of simplicity, economy and ease of operation. The hauling of water and coal is avoided, fewer operators are required to handle the machine, and a considerable saving of time is noted. For example, it is claimed that the cost of operating a certain electric shovel with 75 horsepower of hoist, 30-horsepower thrust and 30-horsepower swing-boom is 1.64 cents per cubic yard of gravel, clay and sand, which compares favorably with the cost of similar work with the ordinary steam operated type.

LARGE ELECTRICALLY-OPERATED SHOVEL BUILT BY THE VULCAN STEAM SHOVEL CO., TOLEDO, O.

AN IMPROVED PIPE MACHINE.

The use of the change gear drive, eliminating the cone pulleys, and providing as a substitute a single pulley running at constant speed, has become all but universal with a number of different types of machine tools, and we illustrate herewith the extension of this device to a large pipe machine. The machine itself is of the well known type built by Bignall & Keeler Mfg. Co., Edwardsville, Ill. In this drive the makers say that there are no rocking gears or clutches, and that all the gears in the box are made of steel and run in an oil bath. A speed plate on the box gives the proper speeds for the different pipe sizes. The design illustrated is also furnished with steel chuck slides in place of cast iron, as formerly fitted, with a consequent lengthening of life. The machine shown is adapted for pipe sizes from 2½ inches to 8 inches inclusive.

Mine Improvements.—The Wharton Steel Co., Philadelphia, has been making extensive improvements to its Hurd and Orchard mines in the vicinity of Wharton, N. J., and both these operations are now in shape to yield a heavy tonnage. The electric concentrating works, originally centered at the Hibernia mines, are being gradually removed to the Hurd and Orchard workings.



IMPROVED ALL-GEARED PIPE MACHINE.

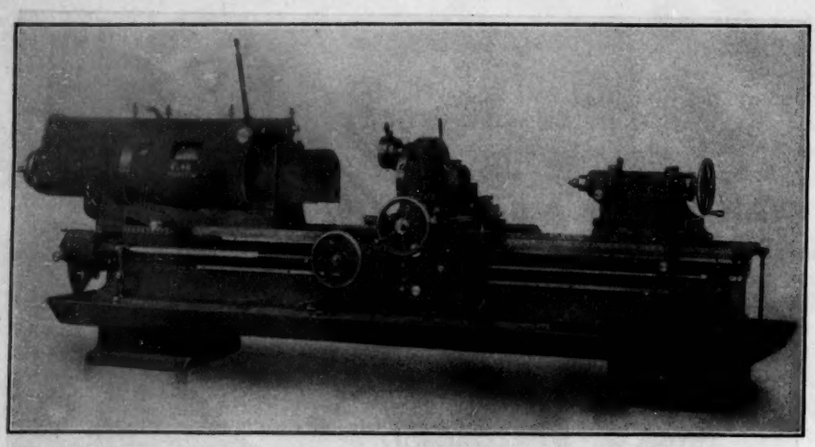


FIG. 1—FRONT VIEW OF "MARVEL" LATHE.

A NEW LATHE FOR DUPLICATE WORK.

The Lodge & Shipley Co., Cincinnati, has brought out a new lathe for rapid production of duplicate work from bar stock, to which they have given the name of "Marvel." The tool does not, however, work full length stock, but material cut to length. This, while requiring an additional operation and rehandling, has compensating advantages which will suggest themselves, as for instance, reduced floor space, quieter operation, no accumulation of stock about the machine, etc.

The stock is gripped in the chuck in the spindle nose through the movement of the hand lever shown on top of headstock, operating a draw tube within the main spindle, which closes the collet jaws upon the work. The longitudinal position of the piece in chucking is fixed by the axial screw shown at rear end of spindle.

The carriage and tool blocks are clearly shown. In addition to the front and rear tool blocks of familiar design, but which are independently adustable longitudinally and transversely, a rotating tool holder carrying four or more tools is also mounted on the bridge of the carriage.

The rotating tool holder is fitted with a plunger-locking device for each position, operated by a lever which also controls the stops which determine the work diameters. Both the slide carrying the front and rear tool blocks and that carrying the rotating holder are adjusted independently of each other by the single hand wheel at the front of the carriage by means of a friction device in the hub of the wheel.

As the tool is essentially a multiple-production machine, the control and operation of the automatic stops is the most important feature. Referring first to the diameter stops, the construction is as follows: Paralleling the bridge of carriage and journalled in the front and rear arms, is a bar with T-slots milled lengthwise. The bar diameter is reduced at one end, so that the stops may be inserted. These stops may be located in any desired position on the slotted bar. On the front end of the bar, means of adjustment is provided for taking up end wear. On the rear bearing is a stationary steel clutch with teeth corresponding to the T-slots in the bar. On the reduced end of the slotted bar is a second clutch free to revolve with the bar and kept in engagement with the stationary clutch by means of a spring. Spiral grooves are cut on the outside diameter of this free clutch and correspond in number with the slots in bar.

On the tool-block slide are two hubs; the front hub is cast solid with the slide, while the rear hub is adjustable longitudinally by means of a T-slot and binding bolts. Shafts are journalled in the hubs, parallel with the slotted bar, with steel fingers at the ends, and in the ends of these fingers and also parallel with the slotted bar are two adjustable screws with means for locking the fingers in the desired position. Each of these fingers has two positions, one for engaging the stops on the slotted bar, and the other for allowing the fingers to pass over the stops. Both positions are maintained by means of a spring latch.

The slotted bar has two sets of stops; one set for the front tool, the other for the rear tool. In the rear hub just mentioned, there is a spring pin, which follows the spiral grooves of the fixed clutch. These grooves are so formed that the forward movement of the slide will cause the end pin engaging the spiral groove to compress the spring which keeps the clutches in engagement. The continued movement of the slide then will cause the bar to revolve, because of the pin traversing the spiral groove. The spiral grooves are of such length that when the slotted bar has revolved sufficiently to bring the next stop into position, the pin leaves the groove and the bar movement ceases and the clutch automatically locks the bar in position, the tool slide is then moved to the new position.

On the return movement of the slide the pin will ride over the top of the spiral and drop into position for the next groove in the clutch, the tool slide being moved into the proper position.

The arrangement and operation of the length stops is as follows: Along the front of the bed just below the apron is a rectangular bar which slides in brackets bolted to the bottom of the bed. The top of the bar is planed

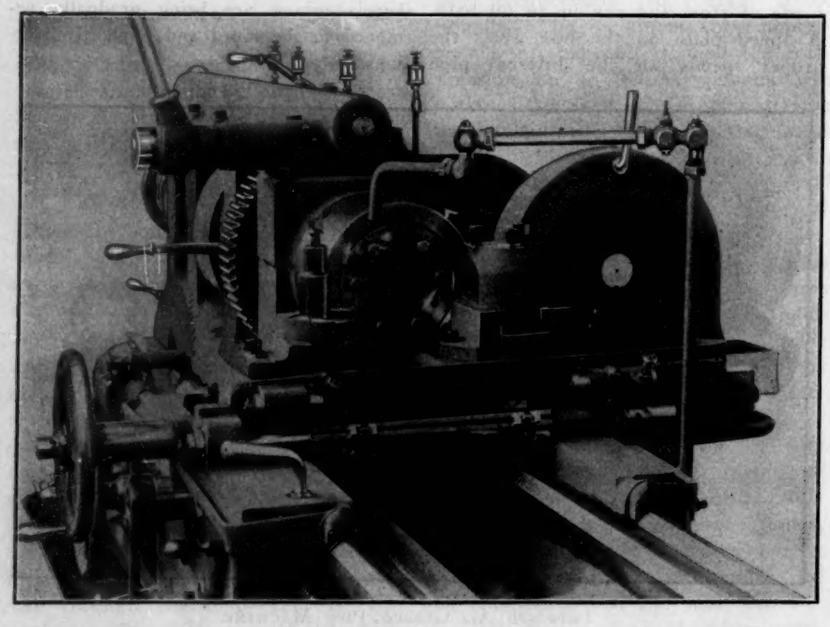


FIG. 3—VIEW TOWARDS HEADSTOCK SHOWING CHUCK AND DIAMETER STOPS

in the form of a dove-tail, to which telescopic stops are secured by means of clamp bolts and which are adjustable the entire length of carriage travel. The head and bracket carries a spring and positive stop which limits the sliding movement of the stop bar.

The lead screw does not run through the sliding feed gear at the head end of the lathe as is usual, but is divided just in front of the head and box, thus making two separate parts. On the right hand end of the short piece in the box is formed a clutch, which engages with a sliding clutch keyed to the contiguous end of the lead screw. This clutch is connected to the stop bar along the front of the bed, by means of a pivoted lever, the bar having just sufficient movement to disengage the clutch.

On the bottom of the apron is bolted a bracket carrying a pivoted arm to engage the stops on the sliding bar. When engaged the bar slides with the carriage until the clutch on the lead screw is drawn out of mesh, stopping the carriage; at the same time the bar comes against the positive stop.

The pivoted arm of carriage is now raised out of engagement with the stop; the spring, previously compressed by the movement of the bar, forces the bar back to its former position, re-engaging the clutch and starting the carriage.

The first step in operation after chucking is to bring into position a centering tool in the revolving holder, and after centering, returning the tool holder to the rear and bring up the tail center to the work. The first cut is started with the tool in the front tool block and the first stop on the diameter bar clamped in the position to give the diameter required. The tool travels the required distance up to the length stop which has been previously set. The front tool is then withdrawn and the back tool squares the shoulder.

The forward movement of the slide for the next diameter revolves the diameter stop bar and brings the second stop into position. The second diameter and shoulder are then made in the same manner.

When all the diameters and shoulders are completed the piece is removed from the chuck. If, however, the piece is of such a nature as to require an operation on the end which has been previously gripped by the chuck, it is again inserted with the remaining rough end projecting sufficiently to complete this second operation in a similar manner.

A full set of jaws is furnished with each machine so that any diameter within the capacity of the lathe may be gripped.

The makers say that any 25 pieces taken from a lot made by this machine will not vary 0.002 inch either in diameter or shoulder length.

The "Marvel" lathe is made in three sizes, 2 x 24 inches; 2½ x 36 inches and 4 x 48 inches, the figures having reference to the diameter and length of stock which can be handled.

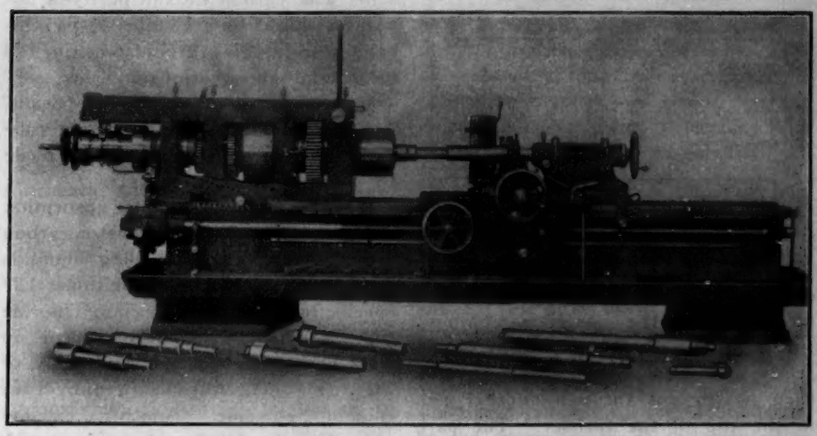


FIG. 2—LATHE WITH GEAR COVERS REMOVED AND SAMPLES OF WORK.

THE DIRECT COMBUSTION OF CARBON IN STEEL.

BY FRED C. T. DANIELS.[1]

The following method for the direct combustion of carbon in iron and steel can be carried out in from 15 to 25 minutes. By the use of the method and apparatus described, direct combustion can be made in a porcelain tube. The fire-brick heating furnace used permits the tube to be heated to a sufficiently high temperature to burn off the carbon directly in the iron or steel. This cannot be done satisfactorily in the ordinary tube combustion furnace. The method is adaptable to a small iron and steel laboratory, where it is not advisable to go to the expense of purchasing the necessary platinum apparatus, or electrical furnace. It is also efficient in a large laboratory, as the furnace can be constructed so as to hold two, three or four tubes. The furnace may be constructed by one person in half a day. It is built of fire brick and clay. The apparatus consists of:

(1) A fire-brick heating furnace, Fig. 1, and a Fletcher burner, with gas and air blast. The furnace can be raised to the desired temperature in one to one and one-half hours. An air blast is not necessary, but it gives better results. The flame enters through a 3-inch hole in the back of the furnace into the combustion chamber, then through a ¼-inch slit into the cylin-

[1]Chemist, Mackintosh, Hemphill & Co., Pittsburg.

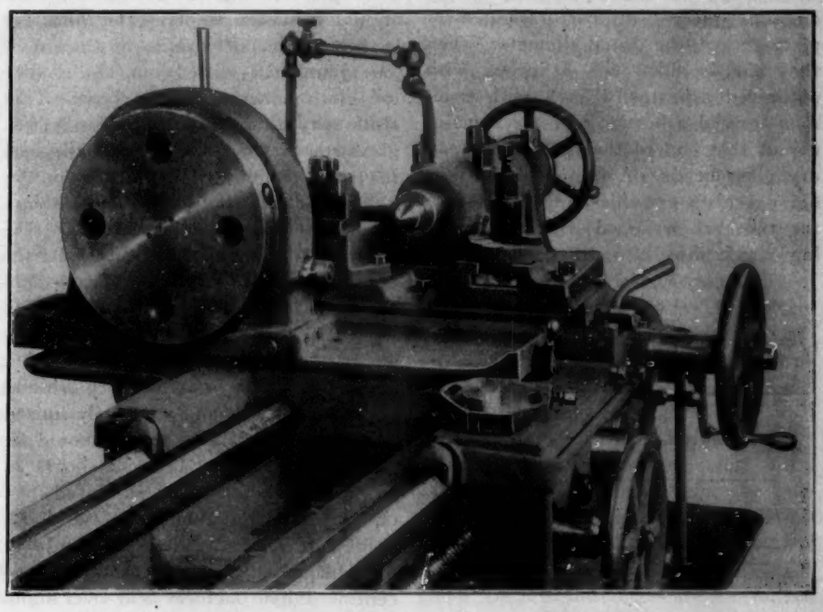


FIG. 4—VIEW TOWARDS TAILSTOCK SHOWING ROTATING TOOL HOLDER.

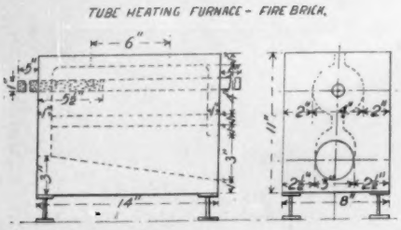


FIG. 1.

drical tube chamber, through the center of which the porcelain combustion tube passes. The flame plays directly upon and around this tube and then passes out through another slit in the top of the furnace. The part of the tube contained within the chamber should be at a good white heat.

(2) An oxygen purifying apparatus, Fig. 3. The oxygen first passes through concentrated sulphuric acid to which a few crystals of potassium bichromate have been added, then through potassium hydroxide solution 1.27 specific gravity and is finally dried with soda lime and anhydrous calcium chloride.

(3) The porcelain combustion tube is a Royal Berlin porcelain tube, 20 millimeters diameter. The cheaper tubes are good enough because the furnace may be heated gradually and maintained at an even temperature. When cooling off at night the apertures of the furnace should be closed with asbestos board, which will allow the tube to cool slowly. Thirteen and one-half inches from the end of the tube at which the oxygen enters, is placed a plug made of a circular sheet of asbestos board 3/16-inch thick. This plug is perforated in the center with a pin hole and fits the tube snugly. Beyond this is placed a circular piece of perforated sheet platinum of the same diameter, then the tube is filled for 5 inches with platinized asbestos, 1 inch with common ignited asbestos, and the remainder of that end of the tube with clean dry glass beads, or with finely broken old porcelain crucibles. Both ends of the tube are wrapped with wet wicking which dips into vessels of water.

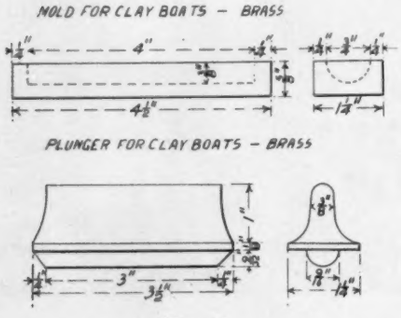


FIG. 2.

(4) The carbon dioxide purifying apparatus, Fig. 3, is a U tube, ½-inch diameter, containing granulated zinc, 20 mesh, and phosphoric anhydride, separated by a column of glass beads. The connection to the porcelain tube and the absorption apparatus is made by means of goose necks.

(5) The carbon dioxide absorption apparatus, Fig. 3, is a Johnston carbon dioxide bulb. The absorbing liquid is potassium hydroxide solution 1.27 specific gravity. The calcium chloride tube is filled with finely broken up stick caustic potash, the bulb only of the tube being filled with anhydrous calcium chloride. Another calcium chloride tube filled with broken stick caustic potash is used to protect the absorption bulb from atmospheric carbon dioxide and moisture during the combustion.

(6) The clay boats used for holding the charges are made in the laboratory from a good fire clay, using the brass mold shown in the sketch, Fig. 2.

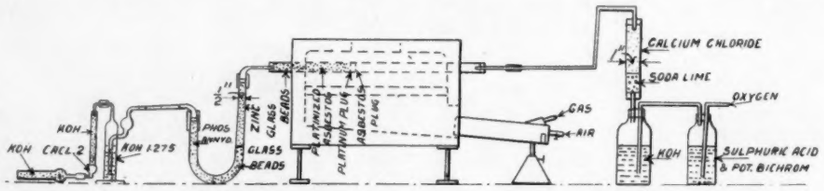


FIG. 3—ARRANGEMENT OF APPARATUS.

A piece of paper 4 inches long and 2 inches wide is laid in the brass mold and the hollow filled up level with moist, plastic fire clay. A small piece of cheese cloth is laid over the plunger, covering it completely, and it is then forced down into the clay. The plunger should be kept to one end to allow for making a handle, and care should be taken to have the side and bottom of a fairly uniform thickness. The plunger is lifted out and leaves the cloth adhering to the boat. This cloth may now be peeled off. A wet glass rod is then forced down through the solid end of the boat to form the handle. The boat is now of the shape required. The paper is carefully taken from the mold with the boat adhering to it, and is placed bottom side up on a level board, to air dry for 24 hours. The paper may then be peeled off and the boat burned in a muffle furnace. The furnace should be cold at first and gradually raised to a good red heat. A boy should be able to make from 15 to 20 boats in an hour. A boat may be used five or six times. After using, the loose oxide and sand are removed and the boat placed in a beaker of warm concentrated hydrochloric acid over night. The iron may then be easily removed. The boats after washing and drying are then ready for another determination.

A piece of heavy copper wire, bent at one end to form a small hook, is used to draw the boat out of the combustion tube.

The steel drillings should be in thin curls, or, if obtained with a diamond point drill, should be fine enough to pass a 20-mesh sieve. Cast iron and pig iron samples should be finely ground.

For steel, 0.10 to 0.20 per cent carbon, 4-gram charge should be used.

For steel, 0.20 to 0.50 per cent carbon, 3-gram charge should be used.

For steel, 0.50 upwards, 2-gram charge should be used.

For pig iron and cast iron use 1-gram charge thoroughly mixed with 2 grams of finely divided low carbon steel or electrolytic iron of a known carbon. The red lead method may also be used for cast iron and pig iron. It will then be necessary to somewhat lower the temperature of the furnace. (See Journal of the American Chemical Society, July, 1905. "The Determination of Carbon in Iron and Steel.") The red lead method is adaptable for the ferro-alloys. The copper-potassium-chloride method may be used for the solution of the drillings. The carbon is filtered off in an asbestos plug, dried and transferred to the boat and burned off as in an ordinary tube furnace.

Procedure: The porcelain combustion tube is heated to the required temperature and oxygen is passed through until all the carbonaceous matter is burned out. The carbon dioxide absorption bulb and its counterpoise are filled with oxygen by attaching them to their positions for a few minutes. They are then wiped carefully with a linen cloth and placed on the balance pans. The charge is now weighed out into the clay boat and covered with 30-mesh sea sand, which has been digested with concentrated hydrochloric acid, washed, and ignited. The bulbs are now weighed and connected to the apparatus, and the boat with its charge is carefully pushed into the porcelain tube until it just touches the asbestos plug. The rod is quickly withdrawn,

the connection made, and the oxygen started through the apparatus. The speed of the bubbles should be such that during the oxidization of the iron and carbon, they should pass very slowly through the absorption bulb, but very rapidly through the purifying train. When the oxidization is complete, in from 6 to 15 minutes, depending on the weight of the charge, the oxygen begins to run rapidly through the absorption bulb. It should then be slowed down to about two bubbles per second. The apparatus is swept out for 10 minutes, and with the counterpoise bulb attached for one minute more.

While the bulbs are standing in the balance case before weighing, the next charge may be weighed out into its boat, and the old boat removed from the furnace preparatory to the next combustion.

ACCIDENT PREVENTION AND INSURANCE IN GERMANY.

In an address before the International Association of Accident Underwriters at Niagara Falls, July 15, S. H. Wolfe outlined the elaborate system by which the German government cares for its workmen who, through accident or disease, have been rendered incapable of supporting themselves and those dependent upon them. The gist of his address is given below:

"For several years the leaders of the various governments have realized that a government has some duty to perform to its working classes other than the mere maintenance of law and order. The law of supply and demand which regulates most things is a doctrine not applicable to the price of labor. The anxiety of the laborer to obtain employment leads him to dispose of his services at a price insufficient to provide for his present needs and to lay aside a sum to take care of him during his unproductive periods. This inability to provide may arise from old age, the ravages of disease or the effects of an accident.

"Call this idea paternalistic if you will, but the fact remains that it forms the basis for the remedies applied by every government which has seriously considered the question. For too long a time have we been assuming that the ultimate destiny of the working man is something which we must leave for him to work out; today a new doctrine seems to be accepted, viz.: that the wear and tear of the employe must like the wear and tear of the machinery be considered as a part of the cost of production, and as such, met by the consumer.

"With this fact before them, the different nations have handled this question in different ways. In Germany they seem to have been more successful in dealing with this responsibility in a scientific manner than in other countries.

Automatic Application of Benefit System.

"It may not be uninteresting to follow the history of an accident there. The employers are grouped according to the kind of business transacted. A workman is injured; no question of contributory negligence is raised; the doctrine of the responsibility of the fellow servant is not invoked; no lawyer is hired and none of the aggravating delays of the law are experienced. Automatically and with the regularity of a well-oiled machine, the particular association to which the employe belongs pays the injured workman certain benefits. He may have free medical treatment and receive in addition thereto 50 per cent of his average daily wages, or he may go to a well-conducted hospital where he will be treated free of charge and while he is there his family will receive one-quarter of his average daily wages. This continues for 13 weeks, should the effects of the accident last that long, and the payment is made from a fund to which the employer contributes one-third and the employes two-thirds. After the 13 weeks have elapsed, the relief is furnished from the funds of another association, the contributions to which are made solely by the employers and are based upon the payroll and the hazardous nature of the particular occupation. Not only does the injured man continue to receive free medical treatment, but also a pension according to a sliding scale, the maximum being two-thirds of a year's earnings. Should it be necessary for him to be confined in a hospital he receives the benefit of free treatment in an institution and his family receives assistance, the maximum amount of which is 60 per cent of the yearly earnings. All accidents are paid for unless it can be shown that the disability is due to some intentional act on the part of the working man.

"In addition to the foregoing there are burial benefits provided for, usually amounting to 20 times the daily wages, and in the case of severe accidents there is a pension given to the surviving members of the family under certain restrictive conditions.

Elimination of Legal Delays.

"I have already referred to the automatic nature of this method of protection and have also mentioned the fact that its benefits are enjoyed as a matter of right and not as the result of any recovery in a protracted action at law. Foreseeing that questions, disagreements and disputes were bound to occur, the German government has laid down rules for their settlement. With a care and an attention to details of administration so characteristic of the German people, an elaborate system of government and jurisprudence has been insisted upon. The associations which furnish the funds for sickness insurance and for the first 13 weeks of accident insurance, retain their own administrative functions. The associations which provide for accident benefits from the fourteenth week on, are administered by the employers under the supervision of the Imperial Bureau. Realizing, however, how necessary it is to have the co-operation of the employes in investigating accidents, representation from that body has been provided for.

"Should the insured be dissatisfied with the decision on any question which has been given by the local institution, he has the right to appeal to an arbitration court and after that to the Imperial Insurance Bureau. It would be a refreshing experience for some of the learned judges in this country to witness the procedure in one of these courts. Legal forms and quibble are swept aside in an honest endeavor to ascertain the true conditions surrounding the incident, and once that has been accomplished, justice in its most elementary and purest form is rendered. The parties interested appear personally before the tribunals, and it is unnecessary to retain attorneys for the purpose of representation.

Encouragement of Safety Devices.

"There are two features of this system to which I would like to particularly direct your attention, and I have no doubt but that one of them will be presented to you at this convention in a more interesting and detailed manner by one who has specialized most extensively in that direction. I refer to the encouragement of the installation of the most improved forms of machinery and safety devices for the protection of the life, limb and health of the working man. It is a peculiarity of human nature (at least in our present undeveloped stage) that we are appealed to more readily from the selfish standpoint than from the ethical. While a German employer might realize that his responsibility to mankind requires that he shall install the safest form of machinery, he might defer the purchase of such improvements until his profits were larger, or until he had done the hundred and one things which under the circumstances are considered legitimate excuses for delay. But let

that employer realize that when an accident occurs the circumstances surrounding it will be rigidly investigated and that if any blame can attach to him he will be fined heavily for the disbursements which have been incurred by his association, the chances are that he will immediately realize that good business principles will dictate the necessity for an immediate installation of the best safety devices.

"The other point is one to which I have already alluded—the fact that these remedies are applied with no delay and without the necessity of appeal to the courts. At first blush it might be assumed that this would lead to the filing of false claims, malingering and to an excessive loss ratio, but it would seem that this contingency has been cleverly guarded against, for you will recall that the benefits during the first 13 weeks are payable from the funds of an association to which the employe contributes more than the employer does. The employe is thus brought face to face with the pertinent fact that for every dollar of unnecessary benefits which are disbursed he is paying 66 cents, and this is a most potent argument for the prevention of improper disbursements.

"I have outlined one phase of the system now employed in Germany. We find similar systems with modifications, however, in force in Switzerland, Austria, Hungary, France and other countries. The day when some idea of this kind will find lodgment in this country is not far distant."

PASSING OF AN OLD IRON MILL.

Some historic importance in the iron and steel industry is connected with the passing as an iron mill of the Brown-Bonnell Works of the Republic Iron & Steel Co. at Youngstown, O., which dates from July 1. Upon that date the plant ceased to be a producer of iron in any form, as authority was given for the tearing out of the remaining puddle furnaces and of placing the works upon a strictly steel basis. The process of dismantling the puddling mill has been progressing gradually for several years, but the final abandonment of this department was put in force July 1. As previously announced, the company is installing new 20-inch and 10-inch strictly continuous mills for rolling steel skelp for the new tube works. The addition of these two mills will give the Brown-Bonnell Works five strictly continuous mills, 7-inch, 8-inch, two 10-inch and 20-inch mills. The total rolling equipment of the plant will be eight mills. The original Brown-Bonnell works was established in 1846, but was rebuilt at several subsequent dates. Its abandonment as an iron mill is a striking example of the policy of the Republic Iron & Steel Co. to become a factor of increasing importance in the production of steel.

BREAKS BORING RECORD.

Hole In Marquette Iron Range Is 3,265 Feet Deep.

Marquette, Mich., July 20.—A notable achievement in exploratory work has just been recorded on the Marquette iron range. It is the boring of the deepest diamond drill hole ever put down anywhere on the North American continent. A depth of 3,265 feet was attained. The deepest hole ever bored heretofore was put down in Arizona a year or more ago. That one was bottomed at approximately 3,150 feet.

The Marquette range hole was drilled on lands which George J. Maas and associates are exploring for iron ore in the vicinity of M. A. Hanna & Co.'s American mine, in the territory to the east of Republic. It required six months' steady work to penetrate to the depth of 3,265 feet, and only because the work was in the hands of the most skilled operators was the task accomplished. The utmost care was necessary the last 1,000 feet. How many carats of diamonds were used is information that is not divulged, but considering the flint-like nature of the formation and the great depth attained it is not at all improbable that the carbons with which the drill bits were set represented a value of several thousands of dollars.

While the nature of the ground through which Arizona's deep hole was bored is not known to Marquette range mining men, it is stated that the rocks in the American mine district are much the more difficult to penetrate. The formations are hard and rough, and great care is required in order to keep down the carbon expense and avoid breakages. A surprisingly small amount of equipment and material was used in boring the Marquette range hole, still there were included in the list the following: Two "B" drums, two sets of steel plates, two sets of ball bearings, four sets of wire rope, 639 blank bits, 25 core shells, five core barrels, seven core lifters, four sections of hose, 125 tons of coal, three barrels of cylinder oil and two barrels of engine oil.

It is a question if the depth that has been attained by the Marquette range drillers will be equalled in this country in many years. At any rate, it is very seldom that a hole approximating 3,000 feet is deemed necessary. The work on the Maas lands was done by Cole & McDonald of Virginia, Minn.

New Tube Works.—Construction contracts for the new tube works which the Hazelton Steel Tube Co., a subsidiary of the Republic Iron & Steel Co., will erect at Hazelton, O., near Youngstown, have been placed with the McClintic-Marshall Construction Co., Pittsburg. The plant will consist of three structures including a threading and shipping building, 185 x 540 feet, skelp and furnace building, 228 x 340 feet, and socket and blacksmith shop, 125 x 200 feet. The buildings will be of the usual mill type of construction. The threading and shipping department will be commanded by two five-ton cranes with spans of 80 and 100 feet. A ten-ton crane with 100-foot span will serve the skelp and furnace building. The pipe-making equipment of the works will consist of four furnaces, two butt-weld and two lap-weld and will produce tubular goods up to 12 inches in diameter.

A Large Cantilever Crane.—A Carlisle, England, firm have completed what is believed to be the largest crane in the world. The total height of the crane is 166 feet. It is of the revolving cantilever type, and is constructed for a working load of 160 tons at 95 feet radius. The crane is driven by five large electric motors, and the whole of the machinery is placed on the rear end of the cantilever, and acts as a counterbalance to the load. When tested at Devonport dockyard the crane lifted up and moved about with the greatest ease a load of 240 tons. The crane itself weighs about 950 tons.

TRADE PUBLICATIONS.

STEEL SPECIFICATIONS.—The American Bureau of Inspections and Tests, Monadnock Bldg., Chicago, and 29 Broadway, New York, has issued, in convenient form, the specifications of the American Railway Association and the Pennsylvania Railroad on Bessemer and open-hearth steel rails, with sections, and manufacturers' specifications on rails and splice bars.

THE STORY OF A NEW YORK HOUSE.—Under this title the A. S. Cameron Steam Pump Works, New York City, have published an attractive history of that manufacturing establishment, dating back to its founding, nearly 50 years ago, by Adam Scott Cameron. The folder contains illustrations of numerous Cameron installations, principally in connection with the New York tunnels, iron ore mines and marine work. A large half-tone shows the plant in relation to other points of interest about New York. The cover is illuminated with the plaid of the Clan Cameron.

ORE SHIPMENTS.

Large Amount to be Shipped by Jones & Laughlin Steel Co.

Approximately 1,800,000 tons of ore will be brought down from its properties in the Lake Superior regions by the Jones & Laughlin Steel Co. during the present season. With curtailed operations and unsettled business prospects, the total tonnage mined and shipped by the company last year was about 1,000,000 tons, but the new blast furnaces of the company nearing completion at Aliquippa, Pa., and the more promising conditions of trade have caused orders to be issued for practically doubling the ore supply.

As was the case last year, the bulk of the season's requirements of the Jones & Laughlin company will come from the Lincoln and Leetonia mines on the Mesaba range, and the Lake Angeline mine in the Marquette district. The company also has the Fowler, Grant, Meadow and Longyear mines on the Mesaba, the Jack Pot on the Gogebic and the Rolling Mill on the Marquette ranges. Prospecting for merchantable deposits is being carried on on the new Cuyuna range. The Grant property is being stripped with the steam shovel this year after experimenting for several seasons has demonstrated the failure of the grab system of removing the overburden and the mine is in no condition for shipping at present. The same is the case at the Meadow, Longyear and Jack Pot.

The company has decided to store ore at Aliquippa, Pa., where its new blast furnaces and steel works are under course of erection and will begin to ship there about Aug. 1. Close to 400,000 tons of ore will be piled at Aliquippa to await the blowing in of the group of new blast furnaces of which three stacks will be completed about October or November. With the regular supply in the bins at its Eliza and Soho furnace plants, about 550,000 tons, the company will have approximately 1,000,000 tons in Pittsburg and vicinity for its winter operations. About the same tonnage as usual will be stored upon Lake Erie docks to be shipped to Pittsburg as needed.

The movement of ore from the Lake Superior district to lower lake ports is being handled by a fleet of five vessels, two of which are owned by the company outright and the remaining three by steamship interests in which it holds considerable stock.

The production of iron ore in New York during 1908 was 703,473 tons, compared with 1,018,013 tons in 1907, and the smallest since 1904. The falling off was most acute in the Clinton hematite region and least in the Adirondack magnetite workings. The average for the past five years has been in the neighborhood of 815,000 tons, but from all indications the current year will show a production considerably in excess of this figure and from preparations which are being made for 1910, when the Benson mines and Salisbury workings will be operating, all recent records should be surpassed.

REPORT ON THE IRON ORES OF NOVA SCOTIA.

The Mines Branch of the Department of Mines, Ottawa, which was organized for the purpose of devoting special attention to the economic features of Canada's mineral resources, has just issued a comprehensive report on the iron deposits of Nova Scotia, prepared by Dr. J. E. Woodman, until recently professor of geology at Dalhousie University, Halifax.

This report, which covers very thoroughly the more important iron deposits of the province, consists of 222 pages of text, 63 illustrative photographs, diagrams and maps, and a copious index. The scope and economic importance of the work may be judged from the detailed instructions given to the author, who was requested to give special attention to:

Localities of iron ore deposits so far discovered, and names and addresses of owners; history of development of mines and companies (if any); geological description; analyses of ores; in cases of mines which have been worked, output and statistics; transportation facilities; limestone in neighborhood of deposits; state in general terms character of forest in neighborhood, i. e., whether the supply is sufficient for mining purposes and for the production of charcoal in the event of the introduction of electric smelting; maps of mines (and drill holes, if any).

The report itself is divided into two main parts: Part I deals with the geographic relations of the deposits, their mineralogy and geology, and questions relating to mining policy, bounties and mining laws. Part II is entitled "Details of Iron Districts," and covers more particularly the ores of the Clementsport basin, the Nictaux-Torbrook field, the deposits of Hants and Colchester counties, the ores of the Western Cobequid mountains and of Arisaig, and the ores of Cape Breton, and is replete with analyses of ores, records of bore holes and geological sections, and other statistical data.

Copies may be obtained on application to Dr. Haanel, director of mines, Ottawa.

LAKE SUPERIOR IRON MINES.

In the Virginia district, the properties of the Oliver Iron Mining Co. are being very actively worked. In the Norman pit five shovels are working in the ore. The tracks of the Duluth, Missabe & Northern were extended into the pits this spring and trains of the company run direct to the source of the ore. The Higgins, which did not ship at all last season, is expected to send forward a large shipment this year. It is expected that the shipments from Virginia this year will be the largest in the history of the district.

The Hull-Rust mine at Hibbing is being steadily developed. More stripping is being done, including the excavation of the cut which will furnish an outlet for the Burt and Sellers pits. In its four years, the Hull-Rust has produced nearly 8,000,000 tons of ore, making a record unequalled by any other mining proposition.

Valuable discoveries of ore are understood to have been made in the vicinity of Robinson Lake on the Vermillion range. Explorers are going down further than has hitherto been done, and the outlook is promising. Boring may be extended to a depth of 2,000 feet.

The old Chicagon mine, on Menominee range, promises to be a valuable proposition. The exploration is now in progress. The Chicagon is an old property. It was inactive, however, for a long time until the Oliver Iron Mining Co took an option and spent a good deal of money, but finally abandoned it about two years ago. The Buffalo & Susquehanna Co. acquired the property about two months ago and has been carrying on exploring actively. The company extended the shaft 100 feet below where it was when the Oliver Iron Mining Co. ceased its operations. The shaft will be sunk to a depth of 500 feet.

The new shaft, which has been under construction for two years at Tobin, is now in commission and the ore is now being hoisted. The Tobin shaft is of especially fine construction. Its dimensions within timbers are 22 x 6½ feet, providing for four compartments. The man cage can carry 24 men on a trip. The crusher is of a new type, being placed on a concrete foundation independent of the shaft.

NEWS FROM MANY INDUSTRIES

(In order to assist the post offices in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The Independence Lead & Zinc Co., Joplin, Mo., with an authorized capital of $50,000, has been incorporated by L. C. Miller, John Doran and Victor Lawler.

The Chisholm-McDonnell Iron & Land Co., Superior, Wis., capitalized at $300,000, has been incorporated by Solon L. Perrin, C. W. Bishop and Hilger S. Hammerbeck.

The American Ditching Machine Co., Minneapolis, capitalized at $250,000, has been incorporated by T. S. Harris, F. E. Kenaston, W. S. Harris, T. F. Donager and E. K. Winne.

The Akron Pneumatic Tire Machine Making Co., Akron, O., to manufacture tire machines, has been incorporated by Charles A. Teits, J. L. Reed, J. W. Meeker, M. D. Kuhlke and Charles A. Ley.

Arthur B. Douglass, Patrick H. Murphy, H. A. Bittner, and Lewis Schelosky, all of Buffalo, are the incorporators of the Frontier Boiler Mfg. Co., Buffalo, N. Y., capitalized at $100,000.

The Cooper Heating Co., Dayton, O., manufacturer of heating apparatus, has been chartered with $50,000 capital by Otto M. Rott, T. K. Zehring, W. L. Bleckwell, L. C. Bleckwell, and C. J. Nachtigal.

The Waterman Waterbury Co., Springfield, Ill., to manufacture heating and ventilating systems, has been incorporated with $60,000 capital stock, by James L. Waterbury, L. R. Bissell, and John A. Barber.

A certificate of incorporation has been granted to the Superior Motor & Machine Works, Superior, Wis, with $15,000 capital stock. Those interested are: Solon L. Perrin, H. J. O'Brien and H. C. Lavery.

Thomas and William F. Murray, of East Hartford, Conn., and Joseph Abetz, of New Britain, have filed articles of incorporation as the Murray Brass & Foundry Co., New Britain, with an authorized capital of $2,400.

The Halsey Mfg. Co., Lynn, Mass., has been chartered to manufacture machinery, tools and equipment. The capital stock is $250,000, and the incorporators are E. S. Halsey, S. C. Halsey and W. M. Nye, all of Lynn.

The Malleable Equipment Mfg. Co., Toledo, capitalized at $10,000, has filed application for a charter to manufacture malleable iron castings. The incorporators are William Coghlin, F. E. Abbey, D. E. Holland, Paul Ragan and A. F. Connelly.

The Foust Concentrator Co., Chicago, has been incorporated with $100,000 capital, and will manufacture ore concentrators and coal washing machinery. The incorporators are George H. Williams, John L. Hopkin and George L. Schein, Chicago.

The Western Iron & Stores Co., Milwaukee, Wis., has been chartered to manufacture engines and other machinery, by John H. Hurley, Charles E. Munroe and S. E. Hauxhurst. The capital stock has been placed at $100,000.

The Taylor Nut Lock Co., Dallas, Tex., has been granted a certificate of incorporation authorizing it to manufacture lock nut devices with $200,000 capital stock. J. C. Taylor, A. V. Lane and J. D. Ayers are the incorporators of the company.

A charter has been granted to the Southern Mill Supply Co., Charleston, W. Va., to manufacture and sell machinery, tools, etc., with an authorized capital stock of $15,000, of which $1,500 has been paid in. The incorporators include A. B. Murray, Charleston, W. Va., James W. Grier and others, of Pittsburg.

A certificate of incorporation has been granted to the United States Slicing Machine Co., Chicago, to engage in the manufacture of machinery. The capital stock of the new corporation is $2,500, and it has these incorporators: John C. Woodington, John P. Brown, John F. Hagey, First National Bank building, Chicago.

The Ideal Carriage Washer and Automatic Water Saver Co., Rochester, N. Y., to manufacture carriage washers, drinking fountains, etc., with $20,000 capital, has been chartered by Edwin P. Gaylord and Ernest L. Gables, Rochester, N. Y., and William J. Stephens, Titusville, Pa.

The Keystone Stoker Co., Boston, has been organized to manufacture and sell machinery, with an authorized capital of $200,000. The company has these officers: President, Almon B. Terry, 15 Brunswick street, Brockton, Mass.; treasurer, George Hartwell, 89 Crescent road, Brockton, and clerk, Charles H. Gilmore, 1001 Gilmore building, Boston.

Articles of incorporation have been filed by the De Schaum-Hornell Motor Co., Hornellsville, N. Y., to manufacture automobiles, motor cars, etc., with $150,000 capital stock. Those interested are William A. De Schaum, 18 Court street; Harvey J. Hopkins, Ellicott Square, and William C. Paul, 18 Court street, all of Buffalo, N. Y.

Application for a charter has been filed by the Robinson Boiler & Mfg. Co., Robinson, Ill., to manufacture engines, boilers and machinery. The capital stock is $110,000, and the incorporators are: F. M. Lewis, J. P. Stone, and F. G. Viger, Robinson, Ill.

The New System Planter & Machinery Co., Wood River, Ill., has filed articles of incorporation authorizing it to manufacture machinery and implements, with $20,000 capital stock. The incorporators are Frank E. Culp, Peter A. Cuter, M. N. Taylor, Wood River, Ill.

The S. Z. R. Stove Repair Co., Brooklyn, N. Y., to manufacture castings for stove repairs, has applied for a charter with $10,000 capital stock. Incorporators include Louis Reiner, 436 Grand street, Jonas Zimmer, 235 Broome street, and Moses Schlansky, 1466 Fifth avenue, all of New York City.

The National Anti-Friction Roller Bearing Co., Buffalo, N. Y., manufacturer of anti-friction roller bearings, has been incorporated with $250,000 capital stock, by Albert T. Killian, 76 Greenfield street; Frank D. Tracy, 76 Johnson Park, and J. DeZielincki, 762 Auburn avenue, all of Buffalo, N. Y.

The Cambridge Iron Works, Cambridge, Mass., has been incorporated with $25,000 capital. The officers are: President, John C. Dow, 14 Chatham street, Boston; treasurer, Robert C. Bird, 92 Broadway, Cambridge, Mass.; clerk, William K. Campbell, 212 Sixth street, East Cambridge.

New Construction:—

The Commonwealth Edison Co., Chicago, has bought of the Chicago Dock & Canal Co. a tract of land on Indiana street, on which it proposes to erect a sub-station at a cost of about $100,000. The rapid growth of manufacturing in the district is said to demand the station.

The Cincinnati Iron & Steel Co. is engaged at present in improving its warehouse facilities and will build a large machinery warehouse. It also plans to remodel its office building now situated at the corner of Front and Freeman streets.

The National Malleable Castings Co., Cleveland, is erecting an addition to its plant, 276 feet long and 100 feet wide. The building will be of steel construction, with brick walls and concrete roof. The general contract has been awarded to the Van Dorn Iron Works Co., Cleveland.

The F. B. Stearns Automobile Co., Cleveland, is beginning the construction of a five-story brick building, 50 x 200 feet. This is the first of several new factory buildings which will be erected by this concern in the near future. The structure is to be finished by Oct. 1.

The Cleveland Foundry Co., Cleveland, O., is erecting a large addition to its present plant. Plans have been prepared by the Osborn Engineering Co., which provide for a five-story and basement building, 60 x 200 feet. The estimated cost will be upward of $100,000. The general contract has been awarded to George B. McMillan, Cleveland.

J. W. Lathrop & Co., Mystic, Conn., are making additions to their marine gas engine factory and installing new machinery. Included in their increased equipment are grinders, radial drills and high speed lathes. Motors for government boats used in connection with the lighthouse, custom house and life saving service form a considerable part of their output.

The Marshall & Huschart Machinery Co., Chicago, has leased land on West Madison street adjoining property already controlled by the company and will occupy the site with a factory to cost $250,000. The land just acquired is held on a ninety-nine-year lease at a rental of $2,000 a year.

Enz & Orr, Denver, Col., are reported to have acquired title to land adjacent to the Denver and Rio Grande railroad amounting to 25,000 square feet upon which they intend to build a new foundry.

The Willard Machine & Tool Co., of Cincinnati, has acquired land in Covington, Ky., and is preparing to move its plant. The city has granted the company certain concessions in the matter of taxation and the company proposes to build at once.

Ground has been broken for a machine shop, 128 x 160 feet, and a foundry, 80 x 150 feet, for the Ruston Foundry & Machine Shops, Alexandria, La. The Ruston company has recently bought the Enterprise Iron Works and will move its Winnfield plant to Alexandria.

The Des Moines Bridge & Iron Co. has taken a contract to build a 100,000-gallon tank for the Victor Talking Machine Co. at its Philadelphia plant. The tank will be 47 feet high and the bottom of it will be elevated on a structural steel framework 125 feet above ground.

The Vulcan Iron Works, Seattle, Wash., is preparing to build a foundry, forge and pattern shops. A machine shop is also contemplated.

The Defiance Machine Works, Defiance, O., has secured a site for an addition to its works and plans are being prepared for the building.

Architects are preparing plans for a group of buildings for the Keystone Supply & Mfg. Co., Philadelphia. A factory, office building and pipe shed will be erected.

The Sheldon Axle Works, Wilkesbarre, Pa., will erect an addition, 400 x 60 feet.

The W. F. Norman Sheet Metal Mfg. Co., Nevada, Mo., is to enlarge its plant by the addition of a brick building 88 x 150 feet.

The Hanover Wire Cloth Co., Hanover, Pa., is enlarging its shipping department and plans an addition to its machine shop.

The DeSoto Foundry Machine Co., Mansfield, La., will erect a side blow converter, steel casting plant.

The Standard Chain Co., East York, Pa., is building a storage house, 288 x 56 feet, on the line of the Maryland and Pennsylvania railroad.

A pattern shop and foundry are being planned by the Gawley Foundry & Machine Co., York, Pa.

The Keystone Steel & Wire Co., South Bartonville, Ill., is planning an addition to its fence factory.

Kitselman Bros.' wire fence factory, Muncie, Ind., is being enlarged to accommodate an increased working force.

The Ketcham Iron Co., Ft. Smith, Ark., is engaged in building a foundry, 160 x 60 feet.

The Valley Machine Works, Grand Rapids, Mich., is building a two-story addition to its plant.

The Waukesha Motor Co. has let a contract for the erection of a factory, 88 x 135 feet.

The Frontier Iron Works, Buffalo, is preparing to erect a two-story, brick machine shop.

General Industrial:—

The new building in process of erection by the Frog, Switch & Manufacturing Co., Carlisle, Pa., to replace the building recently destroyed by fire, will be of steel and concrete construction, having an extreme length of 460 feet and an extreme width of 165 feet, with two electric traveling cranes running the entire length of the shop, and a third in the loading department. All of the machinery will be electrically operated on the individual machine plan. The equipment will be from 25 to 50 per cent greater than that of the old shop, and it will give the company a capacity of from 20,000 to 25,000 frogs and switches per year, with a similar increase in the production of other material it has been supplying to railroads and mines. The McClintic-Marshall Construction Co., Pittsburg, will furnish the steel work, and the walls of the building will be of reinforced concrete. The windows will have lighting surface of about 15,000 square feet, and the skylight capacity will about equal that of the windows.

Owing to the rapid increase of its fan and blower business, the B. F. Sturtevant Co., Hyde Park, Mass., has found it necessary to increase its capital. The new corporation is organized under Massachusetts laws with $1,250,000, 6 per cent, cumulative preferred stock and $1,250,000 common. The stock has all been taken by a few of the large owners. John Carr has been elected president, Eugene N. Foss treasurer and E. D. Freeman general manager. The increased capitalization largely represents capital expenditures during the year entailed in the erection of the new plant in Hyde Park which cost over $1,500,000. This concern has been doing a business of about $3,000,000 annually and the plant will be still further enlarged next spring.

The Aetna Foundry & Machine Co., Warren, O., recently closed a contract for the iron work for all of the furnaces and producers to be installed in the new tube mill of the Hazelton Tube Co., Hazelton, Pa., the contract calling for about 400 tons of material. This company also has ready for shipment two doubling shears and a large steam doubler for the DeForest Co., Niles, O., in addition to which the equipment for the tin house of the Philips Sheet & Tin Plate Co., Weirton, W. Va., will be ready for shipment early next month.

The Modern Machine Works, St. Johns, Ore., reports that within five weeks of the time when fire destroyed its machine and blacksmith shops a new plant was built and in operation. The machinery in the plant was not badly damaged and was repaired with little expense. The machine shop is 50 x 36 feet, and the blacksmith shop 20 x 30 feet. The foundry, 40 x 36 feet, was not damaged. No new machinery is needed by the plant at

present but later the company contemplates adding to its equipment.

A receiver has been appointed for the Phoenix Steel Co., Pittsburg, upon application of the stockholders. The company has been doing a fabricating and erecting business with shops at Economy, Pa., but it recently leased its plant to another interest. It has a number of important contracts on hand which the receiver has been directed by the court to complete, and it is believed that the affairs of the company may be wound up without loss.

Increased demand has made it necessary for the Huron Iron & Steel Co., Huron, O., to increase the capacity of the plant considerably. Within a few days, the plate mill will be operated on three eight-hour shifts; the bar mill will be placed on a double shift. The company's new open-hearth furnace, which has been in course of construction for several weeks, is just about completed.

The Rhodes, Curry & Co. car works, St. Johns, N. B., has passed under control of C. Meredith & Co., Ltd., and the Royal Securities Corporation of Montreal. The transfer is said to foreshadow a still more extensive merger.

The Industrial Supply & Equipment Co., Philadelphia, announces that it proposes to manufacture and market engineering specialties. Building plans have not yet matured.

The W. A. Jones Foundry & Machine Co., Chicago, has added an extension to its office building and has installed several new tools in its machine shop, among them being a Niles boring mill. The company reports an excellent demand for its pulleys and power-transmission equipment, and says its inquiries indicate a large number of new concerns starting in business.

The Uhler Motor Co., St. Joseph, Mo., advises that it proposes to build its engine, probably in three sizes, by contract for the present and not to build and equip a plant before next season. The machines will be assembled in St. Joseph. The company is anxious to get out patterns at an early date and would like to negotiate with firms in that line.

The Manitowoc Boiler Works Co., Manitowoc, Wis., has received several more big contracts from the western territory, notably that for four digestors for the mammoth plant of the Marathon Paper Mills, of Oregon City, Ore. The company has completed three large Scotch type boilers for the Goodrich Transportation Co. Orders necessitate weekly additions to the force.

The Pacific Coast Steamship Co., San Francisco, has just inaugurated the shorter work-day in its shops and for all mechanics affiliated with the Iron Trades Council. Although the Pacific Coast Steamship Co. is not a member of the Metal Trades Association and therefore not bound by the agreement of the latter, it voluntarily assumes an obligation to which it is not a party.

A resolution was recently introduced in the common council of the city of Buffalo, favoring the erection of a municipal plant for casting water pipe. Buffalo is now constructing a new water system and complains that it cannot get its orders filled satisfactorily.

The Missouri Hills Zinc Co., Joplin, Mo., advises that its present plans contemplate drilling upon land already owned by the company. The company also intends to buy more land with a view to building smelters where the prospect warrants.

The Hocking Valley railroad has placed an order with the Case Crane Co., Columbus, for an electric crane having an 85-foot span, for installation in the middle bay of one of its shops at Logan, O. The railroad company is building 75 new cars at this plant, and is operating at capacity.

The Portsmouth Steel Co., Portsmouth, O., is preparing for extensive-improvements to its plant which will be begun in a few days. The plant is to be enlarged and new equipment installed. The mill is running steadily now in all departments.

The Briggs-Shaffner Co., Winston-Salem, N. C., advises that all its plans for extensions and betterments are now complete. It has completed a small shop in which it is now working about 15 skilled men and has room for about 50. The shop is designed for the manufacture of light machinery.

The Lobdell Car Wheel Co., Wilmington, Del., advises that its new roll shop, 66 x 122 feet, is under way and that contracts are let for all the equipment that will be required.

It is reported from Crystal Falls, Mich., that the ore stock of the Great Western Mine is to be moved. Longyear & Hodge have located at Crystal Falls, and are preparing for a large exploratory campaign. They expect to have five drills at work and to explore some new territory.

The Cambria Forge Co., Johnstown, Pa., advises that the fire in its plant early in July practically destroyed the plant. Plans for rebuilding will be delayed until the insurance is fully adjusted.

C. H. Jones has been appointed receiver of the Standard Machine Screw Co., Cincinnati. The firm is said to be solvent, but the partners, Charles Kolb Jr. and Daniel Martin, fail to agree as to the management of the business.

The Ray Consolidated Copper Co. has let a contract for structural steel amounting to about $325,000, to the Kansas City Structural Steel Co., Kansas City, Mo. The material is to be used in a concentrator and smelter at Kelvin.

The Meyersdale Sheet Steel Works, Meyersdale, Pa., has been purchased by Enoch Stanford, of Germantown, Pa., and will be conducted as the Philadelphia Sheet Steel & Tin Plate Co., with headquarters in Philadelphia.

The Kansas City Steel Scraper Co. has bought thirty acres of land in Kansas City, at a price stated to be $104,187. The company was recently incorporated in South Dakota with a capital of $2,000,000.

The Allegheny Steel Co., which recently increased its capital from $500,000 to $1,500,000, has taken over the plant of the Reliance Tube Co., Brackenridge, Pa.

The Sheffield Coal & Iron Co., Russellville, Ala., has placed prospectors in the field at La Grange near Leighton, to prospect the iron ore in that neighborhood.

The receivers of the Norwalk Steel & Iron Co., Norwalk, O., have been discharged by Judge Tayler of the federal court in Toledo, and their bond canceled. The property has been sold.

Rathbone, Sard & Co., stove manufacturers, Aurora, Ill., announce that they will resume full time after a long period of idleness.

The Southwestern Iron Foundry, Guthrie, Okla., recently found it necessary to increase both night and day crews to keep up with the demands for its product.

The furnaces of the Salem Iron Co., Leetonia, O., have been relined and a gas washer installed.

Fires:—

Fire originating in the boiler room of the iron works belonging to Henry N. McCathron, Bridgeport, Conn., July 16, did considerable damage.

Fire visited the foundry of the Port Huron Engine and Thrasher Co., July 17. Considerable damage was done, but the officials of the company announced that a week's work would repair the loss.

The plant of the Bergen Iron Foundry, 261 Grant avenue, Jersey City, was visited by fire July 22. Considerable damage was done to the pattern shop, but the operation of the plant was not materially interfered with.